# The Builder.

Vol. LVI. No. 2918. Saturday, June 6, 1889.


## ILLUSTRATIONS.


St. John's Church, Barmouth, North Wales.—Messrs. Douglas & Fordham, Architects ..... *Double-Page Ink-Photo.*

Newnham College, Cambridge: Old Hall, Clough Hall, and Sidgwick Hall.—Mr. Basil Champneys, B.A., Architect ..... *Double-Page Ink-Photo.*

Chelsea Free Public Library: Competition Designs, viz., First Premiated Design, by Mr. J. M. Brydon, Architect; Second Premiated Design, by Mr. E. W. Mountford; and Third Premiated and Alternative Designs, by Messrs. Leach & Baggallay ..... } *Two Single-Page Photo-Litho's.*

Wesleyan Chapel and Schools, Kitto-road, Peckham.—Mr. E. Hoole, F.R.I.B.A., Architect ..... *Double-Page Photo-Litho.*

*Blocks in Text.*

Diagrams of Ceilings, in Illustration of Mr. Basil Champney's Paper on Plaster-work ..... *Page* 427

Plans of Competition Designs for Chelsea Free Library ..... 431

Diagram illustrating House Drainage ("The Student's Column") ..... 432


## CONTENTS.


The Electric Lighting of London ..... 423
The Revival of Plaster ..... 429
Notes ..... 433
Architecture at the Royal Academy.—VI. ..... 435
Royal Institute of British Architects ..... 436
The Architectural Association: Vacation Visit to Eton College ..... 429
The Institution of Civil Engineers: Annual General Meeting ..... 429
The Forced Percolation of Water through Concrete: Society of Engineers ..... 430
St. John's Church, Barmouth ..... 430
Newnham College, Cambridge ..... 430
Chelsea Free Library Competition ..... 430
Wesleyan Chapel and Schools, Kitto-road, Peckham ..... 432
Obituary ..... 432
Bill to Restrict the Height of Buildings ..... 432
Builders' Benevolent Institution: Election of a Pensioner ..... 432
The London County Council ..... 432
"Geometrical Proportions" ..... 433
Tenders ..... 433
The Student's Column. Town Drainage.—XXIII. ..... 434
Books: Professor Smith's "Graphics" (Longmans); Usill's "Practical Surveying" (Crosby Lockwood); Low's "Applied Mechanics" (Blackie) ..... 434
Recent Patents ..... 435
Recent Sales ..... 435
Meetings ..... 436
Miscellanea ..... 436
New Swiss Patent Law ..... 436
Prices Current of Materials ..... 437


### *The Electric Lighting of London.*

THE recent report of Major Marindin to the Board of Trade in reference to the applications made under the Electric Lighting Acts of 1882 and 1888 for provisional orders and licences is causing considerable discussion in electrical circles, and is being submitted to much severe criticism.

The immediate future of the electrical industry in this country is so dependent upon the action which will be taken by the Board of Trade, and upon the extent to which it will adopt the views officially expressed by Majors Marindin and Cardew, that we propose at a later date looking more fully into the evidence produced at the inquiry and giving somewhat close attention to the statements, frequently contradictory, made by the experts called on behalf of the various petitioning companies. It is clearly only just to the public that, before a company is entrusted with the lighting of any given district, it should be called upon to show that it is in a position sufficiently strong, financially and in other respects, to carry out the work it proposes to do. On this point Major Marindin has been satisfied in all cases save one,—namely, that of the Electrical Power Storage Company. As in connexion with this company the report has been criticised as being harsh and unfair, we will allow Major Marindin's words to speak for themselves. They are as follows. After referring to the opposition of the local authorities, the report goes on to say:—"It is perfectly clear from the evidence of the manager of the company that the company does not intend to exercise the powers which would be granted by the order, but to transfer them to some other persons. I have no doubt that these persons are perfectly willing and competent to carry out the powers and obligations of the order, but I submit that it would be quite contrary to practice to grant an order to any but a properly-constituted company, proved to be in a position to act under it, and as this has not been done, I cannot recommend that the order be granted."

With this view we must say we cordially agree. We presume that had the order been granted, the Electrical Power Storage Company would have made arrangements satisfactory to itself with the "other persons" alluded to in the report, or else it would have let these "other persons" apply for the order themselves. The immediate transference of an order as soon as obtained, in the way here suggested, reminds us too vividly of the sale of "concessions for patents" in the early days of electric lighting to permit us to characterise the words of the report as being either harsh or unjust. Whilst the Board of Trade should be influenced by no factious opposition to any body or bodies applying for powers, it will do well to err on the side of severity in dealing with any case that recalls the old days of the promoter—days which all who are truly interested in the progress of electric lighting must sincerely hope will never return.

In dealing with this great work of electric lighting and electric distribution, if it were merely a question of finance which had to be solved, the solution would be simple enough; but it is more than that,—it is a question also of "system." Most electric lighting companies have adopted one of two systems to which they pin their faith, and we have now the satisfaction of knowing that a very careful examination has been made into the capabilities of each of these systems. With respect, however, to expert evidence at examinations of this nature, those of our readers who have ever followed the accounts of any trial in which technical interests are involved must be aware of the difficulty in deciding the merits of particular cases, where experts are called, not as they should be, by the examining body, but by those examined. The importance of making totally distinct the functions of the expert witness and those of the advocate is so fully recognised that we cannot understand why the older methods of obtaining technical evidence at such inquiries are still retained.

It may not be out of place here to remind our readers as to what the salient points of the two systems involved really are. It must be borne in mind that when an incandescent lamp is giving out its light, a certain quantity of electricity is being forced through the little carbon filament at a certain pressure; and that, just as a given power can be got from a steam-engine by forcing through it a small quantity of steam at a very high pressure, or a proportionately larger quantity of steam at a low pressure, so can we get the same work out of the electric current by increasing its pressure, measured in volts, and lessening its quantity, measured in ampères, or *vice versâ*. For domestic purposes, however, electricity cannot be used at present at more than a comparatively low pressure.

The difficulty which has to be faced by the electrical engineer is not the production of the electric current at the central station, nor its use in a house or factory, but the means of getting it from where it is produced to where it is used. To carry a large current requires a large cable,—that is, a cable containing a large quantity of copper. If, therefore, a company attempted to supply current direct from its generating station to buildings scattered over a wide area, at such a pressure as could be safely introduced into buildings, the amount of capital buried underground in the form of copper cable would render the experiment a costly and prohibitive one. Fortunately, however, the carrying power of copper is unaffected by electrical pressure, so that, if the pressure is raised to a very high amount, the current can be proportionately reduced, and the cables be made correspondingly small, without in any way reducing the amount of *electrical energy transmitted*. If this all-important underlying principle is fully understood, the further elucidatory details of the question follow easily enough. Indeed, the London Hydraulic Power Company is adopting the very same principle when it uses in its mains for the transmission of power a very small quantity of water at a very high pressure, as may have been remarked by those who have noticed the comparatively tiny pipes laid down in certain Metropolitan roadways.

The "continuous-current" system and the "alternating-current" system have now become familiar expressions: in the former the electricity flows steadily in one direction through the copper of the conducting wires or cables; in the latter, the electricity pulsates back and forth like the piston of a steam-engine, altering its direction one hundred or more times each second. For use with this alternating-current there has been devised a very beautiful piece of apparatus called a "transformer" or "converter." Through one part of this apparatus flows a small current drawn from the street mains at a very high pressure; from another part there flows a much bigger current at a low pressure which can be used for ordinary domestic lighting. The transformer or converter has no moving parts to get out of order, and, except for ordinary deterioration of material, may last for an indefinite period. It would thus seem that by means of the alternating-current,

together with the converter, the problem of transmitting the electric current in a practical and satisfactory way has been solved.

To fully appreciate the work of a converter, it may be instructive to take an example. Suppose a particular area requires 40,000 lamps, each lamp taking ½ ampère of current at a pressure of 100 volts; that is, 20,000 ampères of current are required. If this amount of lighting were undertaken by, say, the London Company, from Deptford, a current at 10,000 volts pressure would be sent from Deptford to London, where it would be converted at a distributing-station into a current five times as great under a pressure of 2,000 volts. From the distributing-station the current would be conveyed to the buildings to be supplied, where it would be converted into a current twenty times as great, under a pressure of 100 volts. Now $20 \times 5 = 100$, and $20{,}000 \div 100 = 200$, so that by sending a comparatively small current of 200 ampères from Deptford to London, it is ultimately converted into a current of 20,000 ampères for use for lighting purposes. It may be remarked that in the foregoing calculations no allowance has been made for certain losses which inevitably occur, but as these amount to a very small percentage of the whole, we need not complicate the calculation by their introduction. These details of calculations may be somewhat tedious, but we venture to think they will enable some of our readers to more fully realise what can be done by recent electrical appliances.

It is in this property of easy conversion that the peculiar value of the alternating-current lies. There are, it is true, ways of converting the direct current, but, so far, they have never got beyond the experimental stage; when a continuous-current can be converted and distributed as easily as an alternating one, the alternating system will have to develope new virtues to prevent itself being beaten from the field.

There is, however, a reverse side to this consideration of the transformer system, and in a letter from Professor Sylvanus P. Thompson, in the *Times* of the 1st inst., he appears as the opponent of the alternating-current. For our own part, we are the exclusive advocates of neither system. Professor Thompson is the avowed champion of the continuous-current, and, as all enthusiasts are apt to do on occasions, he has in this case, we think, allowed his pen to run away with him. He points out that the alternating-current cannot be stored in accumulators. This we grant, and we own that this is a very distinct point in favour of the continuous-current, which can be so stored. He then proceeds to say, "It lives from hand to mouth . . . . A mere derangement of an engine or a boiler may, in the absence of storage, plunge a whole district into darkness." Here we join issue, for does Professor Thompson seriously believe that a company lighting a whole district on the alternating system would do so with one boiler, one engine, and one dynamo-machine? We do not believe he can really think so. For example, in the House-to-House station at West Brompton there are already a battery of boilers, three independent steam-engines, and three independent dynamo-machines; the whole plant is interchangeable, and the capacity of the station is greatly in excess of the maximum output at present required. If a boiler, engine, or dynamo broke down, the remaining plant would do all the work, and if the public outside noticed anything wrong it would only be a momentary flickering or unsteadiness in the lights. Storage is unquestionably a great thing, but with spare plant in case of breakdowns it can undoubtedly be dispensed with.

Much more important is the question of distributing motive-power, about which we must now say a few words. Up to the present no really workable alternating-current motor has been produced; while, on the other hand, many exceedingly efficient motors are working in this country with the continuous-current. Owing to this disadvantage, it is recommended in the report that where two companies are given powers over the same area, one, at all events, shall supply the continuous-current. The idea at first sight appears to be that if a particular householder after lighting his house from converters wishes to use a motor, he can do so by getting a continuous-current from the mains of another company. But Major Marindin appears to have forgotten that in a previous part of his Report he says: "Where there are two companies in the same area, different streets should be scheduled for each." We must confess there seems some little contradiction here. Later on in the report we learn "that, in the abstract, competition is desirable, as tending to keep down the price, and to cause the manufacture and supply of electricity to be carried on with all the attention and energy which it is possible to devote to it." In the first place, if but one company can lay its mains in a particular street, we fail to see how any person living in that street can benefit by the competition of another company which is not allowed to carry its mains there. Secondly, if the question of motors is in the position implied in the report, it seems very hard that a house on the line of supply of the alternating company can obtain no motive-power, whilst a house in the very next street, fed from a company working the continuous system, can get all it requires. Such arbitrary restrictions as these are unworkable, and the County Council and Board of Trade must be looked to for their rectification by other means than those suggested in the report.*

For our own part, we are inclined to think the solution will come from an entirely different quarter. So rapidly is electrical engineering progressing, that only last week Mr. Mordey was showing one of his alternating-current machines running as a motor and delivering fifty horse-power. Owing to defects we cannot now go into, such a motor is impracticable for general use; but a start has been made, and we predict that the production of a motor to work thoroughly well with an alternating-current is only a question of time, and that not far distant. This being so, that part of the report based on the assumption that no alternating-current motor exists will very soon cease to have any value.

It appears to us that people in general altogether fail to appreciate what a stupendous matter the general distribution of motive-power by means of the electric current really is. The present companies, it is well known, have hardly sufficient capital to cope with the lighting which they will at once be called upon to undertake. If, then, the opinion of those who ought to know is correct, namely, that far more electrical energy will in the near future be required for power than for lighting, it is mere waste of time to discuss the question of motive-power being supplied by the companies as they are at present constituted.

It is more than probable that just as there are different mains for supplying water for domestic purposes and for power purposes, so there may have to be different mains for supplying electric currents for light and for power. The question of the method of laying such mains is a difficulty which will have to be faced. The inconvenience of having our busy streets continually upturned for the laying of all sorts of electric mains is not one to be lightly encountered, and its magnitude will, it is hoped, lead to its early and thorough consideration. It must be remembered, however, that there is no comparison between an electric main and the huge gas or water mains buried under London streets. A small conduit at the edge of the footway, made easily accessible from the surface, would carry a dozen electric mains for different purposes. The road must be taken up to make the conduit, but if such conduit is the property of the local authorities it could be rented by the companies wishing to use it.

It will be seen from the foregoing considerations that the electric lighting and power distribution for London presents difficulties of no mean magnitude. It is to be hoped that those on whom the duty falls will give them the careful consideration they merit.

* The London County Council, it may here be mentioned, at its meeting on Tuesday resolved to address a letter to the Board of Trade agreeing, in the main, with Major Marindin's Report. To this letter we may have occasion to return.

## THE REVIVAL OF PLASTER.

WE live in an age of revivals in architectural work; we have had revivals of great styles, Greek and Gothic, and so on; and revivals of decorative methods, fresco, and mosaic and wrought-iron; and it would be surprising if plaster, which lends itself so easily to decorative purposes, did not come in for its turn. Such a revival has been a more or less obvious fact for some time past, but Mr. Champneys made a distinct and definite demonstration in its favour by his paper read before the Institute of Architects on Monday evening.

In nearly all that Mr. Champneys said in regard to the treatment of plaster when used in a decorative manner (which will be found in substance in another column) we are disposed to agree; but we do not know that it is altogether desirable that people should be distinctly encouraged in the use of a material which, as a cheap and easy medium for decoration, human nature is in its unregenerate state, only too prone to. It must not be allowed to be forgotten that, after all that can be said concerning the blandishments of plaster, it is after all only a *pis aller*, a substitute for something better which we would have by preference if we could afford it. Plaster is convenient and inexpensive for modelling statues in, but no one pretends he would have a plaster cast if he could afford the marble; nor does any one pretend that he would have modelled plaster decoration if he could have it carved in wood or alabaster or marble. It is a convenient covering for masking the rough wall surface in an interior, but it is not an agreeable one; it makes a great mess in putting it on; the very atmosphere of a plasterer's workshop is enough to give one a distaste for the trade; and for town houses it has the defect of holding a great deal of dirt and not being very easily cleansable. No one would have plaster for the covering of the walls of his sitting-room if he could have oak wainscot or marble inlay, or decorative faïence, or almost anything else. The greatest objection of all is its perishable nature, especially in regard to decorative work; to depend on plaster for any of your architectural detail is at once to introduce into your building a substance which is the reverse of monumental. For this reason we think that those purists of the Gothic revival who took up a crusade against plaster and regarded it as a thing not to be tolerated in the best work, and only in any case to be endured as an unavoidable evil, were by no means as far wrong as Mr. Champneys and others of the modern school would make out. The crusade was carried to excess, no doubt, especially when rough stone walls of random courses were stripped of their plaster covering by the pious restorer, and their nudity accentuated by black pointing in the joints, giving the appearance of a gigantic spider having woven rope-like cobwebs over the walls. This was bad, and there is no doubt that some rough walls have been thus uncovered which were never meant to be seen. But this was cheap building, in fact; the plaster was used to cover it just as modern builders used to use cement to cover bad brickwork; the fact is no better in Mediæval than in modern days. Any one would rather have good and finished stonework or brickwork as an inside finish to a church, than plaster; and we have known people who would rather have brickwork (of a superior stamp of course) as the lining of a house. Still, plaster is useful for an internal finish that is warm, fairly sightly (or may be made so) and inexpensive, and therefore it is not surprising that its use in one form or another should be traced among so many different people of different ages.

But when we come to use plaster decora-

tively, it is, to say the least, a terrible snare. Its fatal facility of being modelled has tempted so many misguided people into trying to give it the depth and force of carving; building it up on brackets to give it an artificial relief which the substance is really not capable of supporting, as in the terrible example which Mr. Champneys mentioned at Audley End, where masses of the stuff are hung downwards from a ceiling in mimicry of the pendants of Tudor vaulting. One cannot look at such things without thinking of Bishop Blougram's criticism after he had been preaching in "that masterpiece of Brother Pugin's"—

"I doubt if they're half baked, those chalk rosettes,
Ciphers and stucco-twiddlings everywhere;
It's just like breathing in a limekiln."

The greatest reticence is to be observed in the use of plaster. In regard to the place where plaster decoration may most fitly be applied, an eminent English landscape painter has expressed the opinion that ceilings ought to be white, as reflectors of light down into the room. Plaster is the easiest way of getting a white ceiling; and when it is there for that practical purpose, why not decorate it? Mr. Champneys' paper practically took the same line, as it dealt almost entirely with ceiling decoration. He complained that ordinary king-post roofs, not decorative and never meant to be seen, had been deprived by restorers of their judicious plaster ceiling and left "plain in their neatness," (as Milton translates "simplex munditiis"). We agree that when the roofs had been constructed with the intention that they should be "under-drawn," it is a piece of Quixotism to remove the covering. But we protest against the assumption that a king-post timber roof is essentially a thing not fit to be shown. It is capable of effective treatment, and has the merit of being very satisfying to our perceptions of constructive stability. It is not to be regarded as only fit for architectural treatment by covering it with a plastered screen. That is putting the accidental before the essential.

Granting that the ceiling is the suitable, or the most suitable place for plaster decoration, we concur in most of what Mr. Champneys laid down as the best method of treating it. Keeping modelled design in very low relief is one of the most important points. As soon as the relief becomes such that you know that there must be special artificial means of holding the plaster up, the thing becomes an offence to our sense of fitness. The suggestion that ceiling decoration, if it leads in any one direction, should lead from the sides to the centre, and not from the centre to the sides, was supported by a good reason. Wall decoration naturally tends to take a vertical character or movement, from the base towards the cornice; and an opposite movement on the ceiling, from the centre to the side, meets the wall decoration awkwardly. Treated the reverse way, it rather suggests the carrying up of the wall decoration into the ceiling, which is much more harmonious in effect. This is true, and it has been a good deal overlooked. Still, it can hardly be made a rule absolute. If, however, the design is made to lead from the centre towards the sides, it should be stopped short of the sides, either by a neutral ground of bare space, or by a strongly-marked border which will entirely divide the ceiling decoration from the wall decoration.

Mr. Champneys thinks that rectangular patterns "militate against repose" in a ceiling. If he means that sort of rectangular pattern which consists in making imitation coffers with panels between, we do not say that these militate against repose; their fault rather is that they suggest a solidity and massiveness of construction which does not really exist. A coffered ceiling of solid construction is a grand thing: a baked imitation in soft material is very much the reverse.

And this brings us to a criticism in regard to plaster-ceiling decoration which we wish to emphasise. A large proportion of what are otherwise the best designs for ceilings, old and modern, consist of a decorative basis of broad bands in relief, having more or less suggestion of a constructive framing, with lighter treatment in the interspaces. Almost every "design for a plaster ceiling" one sees in the Architectural Room at the Academy has this basis. This is certainly a mistake in the treatment of plaster. It is an imitation of the stile and panel system of door-construction, which is natural and legitimate there, because it is the real and the best construction. But to build up a framework of this kind on an expanse of plaster is a treatment for which the material offers no suggestion. The real origin of it is the desire to save trouble in designing surface ornament. A designer who feels unable to sweep over a whole ceiling with a surface design is quite able to cope with a small panel. So he divides the work up into small panels, which are within easy grasp.

As a general rule (and here Mr. Champneys seems to be with us), a plaster decorative ceiling design should be as much as possible an "all-over" design. The only exception is when the actual construction is panelled. Then the plaster design ought to follow it. We might perhaps suggest another application of this principle. Mr. Champneys referred to the often-observed fact of the lines of joists showing white through a plaster ceiling, and offered the probably correct explanation that it arose from dust being carried by the movement of the air through the plaster, and settling in it, more freely in the interspaces than where the joist was at the back of the plaster. But this may really be a hint from Nature to the designer (for the carriage and settlement of dust is an operation of natural forces) to think of the construction in decorating his plaster surface. "The real construction is that of a series of parallel joists. If you do not recognise that in treating your plaster, I will do it for you, in my own way." A decoration following the lines of the joists would obliterate the natural effect complained of. Perhaps some one may be inclined to try it.

## NOTES.

THE International Congress of Architects, to be held at Paris under the auspices of the Société Centrale des Architectes, will open on Monday the 17th, and close on Sunday the 23rd of this month. The opening and closing general meetings will be held at the Trocadéro Palace, the others in the Hémicycle des Beaux-Arts. There will be a banquet at the Hôtel Continental on Saturday the 22nd. The main subjects dealt with by the Congress will be (1) "Enseignement"; (2) "Assistance Confraternelle"; (3) "Propriété Artistique"; (4) various questions which may be treated according to arrangement; among these are put down "Architectural diplomas," "Public Competitions from the architectural point of view," and the "Honoraires" of architects and experts. Under the first head M. Garnier will treat of "The Education of the Architect"; MM. Émile Trélat and Paul Gout will deal further with the same subject; M. E. Guillaume will speak of Architectural Education as it is at the École des Beaux-Arts; M. Achille Hermant on Jurisprudence in connexion with Architectural Education; M. Daly will read a paper on "Hautes Études" in architecture; M. de Baudot on reforms to be introduced into Architectural Education; and M. Charles Lucas on the practical education of the "Personnel du Bâtiment." Among various subjects, papers are promised on Etruscan Art, by M. Eugène Dognée, of Liège; on the Cupolas of the East and West, by M. Alphonse Gosset, of Rheims; on the heating system of ancient baths, by M. Boussard; and on fires in theatres, by M. Chenevier, of Verdun. All information can be obtained from the secretaries, MM. Chas. Lucas and Eugène Müntz, at 28 Rue Serpente, Paris.

THE dreadful catastrophe in the Conemaugh Valley in America, by which thousands of lives have been lost, was no doubt intensified by the swollen state of the rivers from excessive rainfall, and it may be said that the rain was also indirectly the cause of the central calamity of the bursting of the dam, by its combined action in increasing the volume of water in the reservoir and saturating the material of the dam itself, and that the dam might have been safe for the present but for the exceptional rain. This, however, does not alter the fact that we have in this event one more example of the fatal imprudence of storing up an enormous volume of water with no other curb to it than the mere bulk of an artificial embankment of earth, with perhaps a centre of puddled clay. We have not yet had any particulars as to the construction of the dam, but we make no doubt that it was one of these earthworks, such as proved fatal at Sheffield a good many years ago, under somewhat similar circumstances of exceptional weather. The lesson of the catastrophe is that if such immense masses of water are to be held up at a height over an inhabited district by an artificial barrier, it should be a barrier impervious to the action of water, at whatever increase of initial cost this has to be accomplished. We doubt if this can really be efficiently done except by a built barrier with buttresses and horizontal arches and a backing of concrete in hydraulic lime. The expense of such a construction is very great, of course, but the awful result of the failure of the Connemaugh barrier is a lesson that it is almost sinful to count the cost in such a case. We hope that some details as to the construction of the dam, and who was responsible for it, will be forthcoming in due time.

AS our readers are aware, the decision of the Court of Queen's Bench, in the matter of the St. Paul's reredos, has been, by a majority of two out of three judges, that a rule should be granted for a *mandamus* to the Bishop to take action on the case; which however, will be delayed pending an appeal. About the legal position of the case we of course do not say anything, especially as there is to be an appeal; but as to the general merits of the reredos itself we confess to feeling a good deal of sympathy with some of the expressions in Lord Coleridge's judgment; nor can we entirely sympathise with those who say "What a pity if it should be removed after all this labour and expense!" &c. We do not think it is likely to be removed; but in some senses it might be a useful lesson if it were. Even in regard to the ritualistic or religious question, on which we express no opinion whatever, it does not seem a very gracious or agreeable kind of proceeding to get up in secret and behind a screen something which it was well known would cause religious offence to many people: and there is no doubt that this was the case; in fact the reason was given as an excuse for not publishing an illustration until the reredos had been got into position. The important objection to our mind is the architectural objection, which is not the business of the court, but which Lord Coleridge hinted at in his remark that the reredos had shortened the cathedral by 40 feet. What is worse than this is the utterly unarchitectural expedient of putting a semicircular reredos in front of a semicircular apse, absolutely wasting the apse behind, and leaving it a shapeless space unavailable for anything; and the bungling way in which the cornice of the reredos has been thrust into the middle of one of Wren's pilasters, without the slightest attempt at architectural coherence. These seem to us blunders of which any architect ought to be ashamed; and the more so since they were done entirely without any consultation of the wishes of the "Surveyor" to the Cathedral, whose official position and professional *prestige* alike ought to have entitled his judgment in such a matter to respect.

THE appeal of the Royal Academy against the judgment of Mr. Justice North in regard to the true meaning of the terms of the Chantrey Bequest as affecting works of sculpture has been dismissed. As will be

remembered, the terms of Chantrey's bequest were that completed works were to be purchased, but that no commissions were to be given. The Royal Academy argue that as far as regards sculpture this seriously ties their hands, as few sculptors can afford to execute works in monumental materials. The Master of the Rolls, one of the three judges before whom the appeal was heard, summed up in favour of the Royal Academy, arguing that they were bound to use any "artful skill" they could in putting such a construction on the testator's words as "would not defeat what every one who understood art must know was the object of the testator." The two other judges, however, Lord Justice Cotton and Lord Justice Fry, ruled that the terms of Chantrey's will were clear, and could not be set aside. They certainly appear to us to be so; nor can we by any means agree with those who conclude that Chantrey did not mean what his words express. If he had not been a sculptor it might have been different: but being a sculptor, and being perfectly familiar with the fact that sculptured works were modelled before they were carved, he nevertheless made no exception to the condition of his bequest which forbade ordering works on commission. Chantrey must surely have known what he was about when he made this provision, and we do not see that either artists or lawyers have any right to conclude the contrary. It may have been an object in his mind to encourage the production and exhibition of sculpture in monumental materials rather than in plaster.

THE excavations in the Acropolis have for the last year or two completely eclipsed the glory of the Pergamos discoveries. It is satisfactory, however, to find that the work of the restoration of the sculptural slabs of the great altar still goes on steadily, and is, in fact, approaching completion. The *Berliner Philologische Wochenshrift* of May 23 last publishes a sketch of the order of the restoration, from a diagram which was laid before the last meeting of the Berlin Academy of Sciences. The diagram was by Dr. Puchstein, but in his absence was explained by Dr. Conze. The figures of Ares, Herakles, and Hera are as yet missing, but the restorer is not without hope that they may be made out from the fragments yet to be identified. It is impossible, of course, to describe the relative positions of the various gods (fifty in number); the diagram itself must be consulted by those interested in the disposition, but it must be noted that the final positions assigned to the Zeus and Athene groups (of which there are casts in the South Kensington Museum) are at the back of the altar,—not, as might have been expected, in some prominent and central place to the front.

IN the last issue of the "American Journal of Archæology" (vol. v., plate 1), there appears a phototype reproduction of the archaic stele recently found at Dionuso, in Icaria. Of course the main interest of the excavations there has been, as we have pointed out before, the identification of the deme Icaria, and the long series of choragic inscriptions; but incidentally the excavators have come on many interesting sculptured fragments, and foremost among them is the stele in question. It is even on the first glance closely analogous in style to the famous stele of Aristion, long the standard specimen of archaic sepulchral art. The Icaria stele, while carefully maintaining the same type, is of slightly more advanced work, and this presents many interesting points of comparison. The stele is in all its aspects most carefully discussed by Mr. Carl D. Buck, a member of the American School. On Mr. Buck fell all the heavy end of the daily supervision of the Dionuso excavations, and we are glad that the publication of some of the sculptures found falls to his share.

THE Board of Trade have now a more definite idea of the magnitude of the task involved in dealing with the protests against the proposals of the railway companies under the new Act. The extension of the time allowed for making objections has evidently been thoroughly appreciated, as no fewer than 3,000 such objections had been lodged with the Board of Trade by Monday last. Of course, there has not yet been time to classify them in any way,—a large number having come in almost at the last moment,—but, when this can be done, many will doubtless be found practically identical. Sir Michael Hicks-Beach was asked on Tuesday what arrangements would be made for hearing objections, and he stated in reply that an attempt would first be made to clear the ground by settling such points as could be agreed upon with the railway companies. The latter have been requested to arrange for sending their representatives to set forth their views, and every effort will be made to reduce the number of disputed points. All these preliminaries will take up a good deal of time, and several months may possibly elapse before objectors are called upon to argue their cases. In the meantime, a suggestion was made in the House of Commons on Tuesday that inquiries should be held in the large towns in the centre of affected districts, and we believe that something of this kind is in contemplation.

PUBLIC companies generally reserve to themselves the right "to do all such things as are incidental or conducive to the attainment of the objects for which the company is established." This comprehensive clause is sometimes stretched until the operations of the said company includes undertakings apparently altogether outside the original one. Railway companies have thus engaged in a good many industries besides that of "carrying," having become proprietors of hotels and refreshment-bars, omnibuses, and steamers. Their omnibuses convey the general public (if there is room) as well as railway passengers, and are accordingly detested by the other "lines"; while the shipowners are equally resentful against the continually increasing number of vessels flying a railway company's flag. The indignation of the shipowners has been recently increased by the introduction into Parliament, by the Manchester, Sheffield, and Lincolnshire Railway, of a Bill seeking additional powers for working steamboats, and culminated in a meeting held last week at the London offices of the General Steam Navigation Company, at which the following resolution was carried:—

"That this meeting strongly protests against any additional powers for working steamboats being granted to the M., S., & L. Railway Company, and other companies, by Parliament. That competition by the steamship owners, which is so essential in the interests of the public, must sooner or later cease in the face of the abuse, by the railway companies owning steamboats, canals, docks, or harbours, of the unlimited power they possess to maintain a ruinous competition by sea, such only being possible by reason of the unduly high rates they charge for the land services, of which Parliament has granted them the monopoly."

This is a rather strong indictment, and the shipowners intend to follow it up by asking the Prime Minister to receive a deputation in order that these matters may be fully laid before him. It is always a matter of regret when one industry interferes with another,—especially when the offenders are already monopolists in their own more strictly legitimate business,—and the shipowners have adopted a line of argument which is certain to secure for them a considerable amount of sympathy.

THE earthquake of Thursday, the 30th ult., which was felt in many of the towns on the south coast of England and on the seaboard of the north of France, abundantly testifies to the truth of several observations made in our article of the 11th ult. on the effects of earthquakes on buildings. No doubt the reason why the shocks were more severely felt in the houses on the borders of the Channel than elsewhere was due to marginal vibrations, as therein explained. The greater number of the records of the disturbance in the Metropolis show that it was very slightly felt, chiefly in the uppermost stories of high buildings, and we have had reliable information from one correspondent that it was most distinctly felt on the top floor of a three-storied building situated at the end of a long terrace, which, as we have shown, is one of the most dangerous positions for a building to occupy with reference to an earthquake. The motion consisted of four or five horizontal pulls very rapidly succeeding each other, and the direction of the shock was apparently W.S.W. and E.N.E.

ON Monday night, in the House of Commons, in answer to a question from Mr. Mowbray as to "whether the new rose window which was being placed in the transept of Westminster Abbey was entirely different in design to the one which had been there since the beginning of the last century," the First Commissioner of Works replied that he had no authority in the matter, but that having called the attention of the Dean of Westminster to the question, he had been requested to say that the window in question was in a state that made the replacing of the material by fresh stonework absolutely necessary, and that the Dean and Chapter, acting under the advice of their architect, had decided to follow what they had reason to believe was the earlier form of the window, rather than that introduced in the last century. So here is another archæological sham put up. There seems no end of this kind of foolish work. If the existing window was decayed (a statement which we see no reason to doubt), it was quite right to replace it with the best one that could be designed in accordance with the style of its surroundings; but why go through the farce of pretending that it is a restoration of what was there before, or trying to make it appear so? Even if it could be proved to be so (which is impossible), a replica is of no value, in architecture at all events.

FOR several years the interior of the Cathedral at Vienna has never been entirely free from scaffolding, in consequence of the thorough cleaning-down to which the vaulting throughout was being subjected. In the course of centuries the surfaces of the stone ribs and arches had become thickly incrusted with the smoke of wax candles and incense, not only rendering invisible much that was beautiful in design and carving in those airy regions, but casting a heavy, pall-like reflection of blackness upon the church below. On Easter Sunday all scaffolding was gone, and the interior, having been only cleaned, happily not "restored," stood out with a clearness unknown probably since the building was first completed. The Cathedral, dedicated to the Austrian patron saint, St. Stephen, consists of three naves all of equal height, the dimensions being:—Length, 332 ft.; width, 147 ft.; height, 88 ft.

THANKS to the splendid weather at Paris last Saturday, the 1st of June fête at the Exhibition went off brilliantly, and in the evening an immense crowd filled the Champ de Mars, where the illuminations were even superior in effect to those of the opening day. We must remark, however, on the insufficiency of the iron foot-bridge in front of the Pont d'Alma, which connects the two annexes of the Quai d'Orsay. This, which takes the likeness of a kind of triumphal arch, decorated with escutcheons and flags, at the end of the Avenue Rapp, is a clever innovation in iron construction, but the engineer who contrived it did not sufficiently reflect that there might be at certain times a great crowd of people collected on it. There have been accidents already from too great a crowd on its narrow road, and on the fête day a double cordon of police had to be formed to organise the crowd and prevent too many passing at once. M. Alphand has, we believe, taken the matter in hand, and it is probable that the width of this aërial bridge will be doubled. In the evening the scene was a curious one; the restaurants were

filled to overflowing, and many of the visitors were seen sitting about on the lawns over their dinner. The Tower and the central dome and the Trocadéro at the same time began to light up with thousands of lights. The last-named building, the design of the late M. Davioud, which has been much criticised from an architectural point of view, furnishes however an exceedingly satisfactory vehicle for illumination. At nine the fountains under coloured light began to play, and later on a display of fireworks commenced from the end of the Ile des Cygnes, and this multitudinous spectacle went on till midnight. We may say that there are to be five other such displays during the period of the Exhibition, without counting those which will accompany various official celebrations, among others a fête to celebrate the presence of the Shah of Persia.

WE remarked last week, in regard to Constitution Hill, that we expected it would be thrown open to the public; and on Monday night it was announced in Parliament that the Queen had approved of the opening of Constitution Hill for light traffic under rules somewhat similar to those now in force with regard to the road between St. James's Palace and Buckingham Gate. The road will be closed when the Queen is in London. We regret the decision, as one against the real interests of the public, and one which takes away, moreover, all the dignity and meaning of the Constitution Hill arch as a state entry to privileged ground. The whole thing is thus, in the literal Latin sense, "vulgarised." It is far more to the real interest of the London public that some of these quiet London oases should be preserved unspoiled.

BY courtesy of the Office of Works, we have had a closer inspection of the heraldic finials in the now-deserted area of Westminster Hall. These are not worth the terrible denunciations made about them by excited æsthetic members of the House, but it cannot be denied that the effect of the four sitting in a row on the pedestals of the centre stairs is rather absurd, and they certainly seem very much out of keeping with the dignity of the great Hall. This result arises partly from their being rather large in scale for the position and rather small (in another sense) in style. A more massive and monumental, and rather less realistic treatment, would have give them a very different expression. They are too slight and too prominent, as it is, and look too much as if they were very liable to be knocked off. A comparison was made between these and the previously existing "creatures" at the top of the Hall; but these latter are decorously backed against the wall; they do not stand out in the pronounced manner that the new ones do. When the colour of the new stone has toned down they will be less conspicuous in effect. But on the whole we cannot feel much surprised at their being the objects of some mockery. It is not so much that a finish of that kind is out of place there, but that they are poor in style and have a very gingerbread appearance.

THE jury which is to decide the forthcoming preliminary competition for the German National Monument in memory of the late Emperor William has now been named by his grandson, and consists of seven members of the Federal and Imperial Councils and seven artists. Among the former are the Minister of State, Von Bötticher, the Ambassadors of Bavaria and the Hanse Towns, and the President of the Upper House. The artists are the architects Von Leins (Stuttgard) and Blankenstein (Berlin); the sculptors Volz (Carlsruhe), Von Miller (Munich), and Encke (Berlin); the painter Janssen (Dusseldorf), and Dr. Jordan, the Director of the National Gallery at Berlin. The competition will not be an international one, but is to be confined to Germans only, and the result is expected with much interest, especially as the names of the jury and the manner of its composition have given general satisfaction and confidence.

A LARGE portion of the Braid Hills, situated to the south of Edinburgh, has been acquired by the City to be used as a public park. The area acquired consists of 134 acres, and the Corporation have also leased, for a period of ten years, an additional plot of twenty-two acres. The principal object for acquiring the ground was that provision should be made for the formation of a new golf-course in place of that which has so long been in use on Bruntsfield Links, where, owing to the extension of the city and the increased traffic, there is now danger to the inhabitants in the neighbourhood. A connexion between the newly-acquired ground and that of Blackford Hill, an outlying spur of the range, which belongs to the Corporation, has been formed, so as to make them practically one park. These hills are richly clad with gorse, now showing at its best in a mass of golden bloom. They command magnificent views, not only of the city, but of the Forth and of the Lothians and Fife.

THE new West Wing of the Edinburgh Museum of Science and Art has now been opened to the public. It contains on the ground-floor the new library of the Museum, which is 80 ft. by 55 ft. The upper hall has a gallery 10 ft. wide, and in that hall are placed the Indian and Persian collections. The allegorical groups of statuary have been placed over the central entrance, and the building is now essentially complete. The internal arrangements are very simple, consisting of a series of minor halls arranged around three sides of the great central hall, and the lighting is very satisfactory.

THE June number of the *English Illustrated Magazine* contains an interesting article on the story of the Savoy, illustrated by various sketches in the vicinity of the Savoy, by the author of the article, Mr. Dewey Bates. In the *Portfolio* Mr. Loftie's series of articles on Westminster Abbey continues, with Mr. Railton's illustrations, including a fine separate page-plate of a view in the choir ambulatory, executed with remarkable power of effect and precision of detail. The *Scottish Art Review* gives a good reproduction of Mr. Burne-Jones's pretty but sentimental picture, "The Bath of Venus." There are some remarks on "Street Architecture," with two sonnets in praise of Edinburgh scenery, by Professor Blackie. The criticisms on the picture exhibitions are curious reading, displaying a strange perversity of taste with a certain amount of ignorance. In the article on the Academy Exhibition, "The Young Duke" is described as "one of Mr. Orchardson's graceful illustrations of aristocratic life of the time of the Georges"! Why, the whole thing is as French as can be, in costume, personalities, and table ornaments.

THE *Essex County Chronicle* is very indignant because various architects have declined to enter the competition for the new Chelmsford Grammar School, on account of the Governors declining to employ a professional assessor. One of the architects who has signed the undertaking not to compete unless a professional assessor is appointed, wrote that by refusing to appoint one the Governors "were excluding 1,300 architects from the competition." This was an unwise and illogical remark. As the journal referred to observes, "The 1,300 architects have excluded themselves." They have elected not to compete except on certain terms, but they are in no way entitled to demand that their own terms should be accepted. The *Essex Chronicle* is, however, equally in the wrong in its comment. This attitude on the part of the architects, the paper says, "is practically announcing to public and semi-public bodies that, in the opinion of the architects, they are not competent to tell the difference between good plans and bad ones,—between what they want and what they do not want." But unfortunately, that is precisely the fact. Ninety-nine out of a hundred people who have not special knowledge of building are quite incompetent to understand the real meaning and result, so to speak, of a set of plans and sections; and long experience has shown architects that there is little chance of justice being done and of the best plans being selected in a competition unless there is a professional adviser on the committee to explain the merits and meaning of the drawings. The *Essex County Chronicle* rejoices over the fact that there are a sufficient number of architects willing to compete in this case, without "cramming this astounding condition down the throats of the Governors." A sufficient number: just so; but who are they? Quantity is one thing, quality another; and if the Governors knew the truth they would probably find that they have cut out all the men whose plans were likely to be best worth having.

MANY hard things have been said in regard to the Eiffel Tower by architects, artists, and other such prejudiced persons. But the Eiffel Tower and its constructor can afford to despise all this. The Eiffel Tower has been consecrated by receiving the blessing of M. de Blowitz, who in his Paris letter in the *Times* of Monday last says, "I cannot but bestow the greatest admiration on this gigantic work, after seeing it close at hand. The plan, the execution, the details, the sensations which the tower awakens in those who visit it, will send the name of Eiffel to the extremities of the globe, and hand it down to succeeding generations." That, no doubt, was what it was built for: and that is the kind of success which is apt to call forth the admiration of the de Blowitzes of this generation. The tower is no larger than one half-span of the Forth Bridge, but then the Eiffel Tower merely stands upright, whereas the Forth Bridge is built out horizontally into the air over deep water; the Forth Bridge is a useful work of engineering, the Eiffel Tower only a foolish and costly piece of brag. Yet there are numbers of Englishmen who will go over and hold up hands of wonder before the Eiffel Tower, who do not even know where the Forth Bridge is. But they will admire in company with M. de Blowitz, and that is in itself a distinction—of a kind.

## ARCHITECTURE AT THE ROYAL ACADEMY.—VI.

1911. "New Technical School, Stockport": Mr. George Sedger. A good water-colour perspective of a red brick building, to which a certain definite character is given by the grouping and spacing of the windows, which seem to indicate the distinction between the departments of the school. A plan would have enabled us to understand how far this is really in correspondence with the internal arrangement; as it is, we can only guess at this.

1914. "Buller's Wood, Chislehurst": Mr. Ernest Newton. This is described as "alterations," but there is no precise indication how much is new and how much old. The plan shows an admirable variety in the planning of the entertaining-rooms: the drawing-room in particular should be a charming room, with its two fireplaces and picturesque arrangement of bays and alcove. The drawing is a well-executed pen perspective of a low house with a long line of roof ridge and very plain square chimneys, the only picturesque incidents being the projecting bays of various plan. These are probably additions: the eaves cornice of the main roof is carried round them, but the bays are left flat on the top: they seem rather to want something over them. The whole has the merit of simplicity and domestic repose of effect.

1916. "New Hospital for Women, Euston-road": Mr. J. M. Brydon. Picturesquely treated in a simple and (as far as one can guess without a plan) suitable manner. Some use is made of the arches carrying open corridors of communication between one block and another, to produce effect; and the treatment of the boundary-wall, with inverted arches scooped out between the piers, and the space filled in with iron railing, is effective, and gives a play of line which relieves the otherwise utilitarian character of the building.

1917. "Hôtel Métropole, Brighton": Mr. A. Waterhouse, R.A. Very like a hotel; may we

be permitted to say, rather too like one, at least for the Architectural Room at the Royal Academy. By what freak was this put in the centre place, instead of Liverpool University College, which is a really interesting design? That it is a larger drawing seems to be the only comprehensible reason. It is a pity Mr. Waterhouse did not take care that the University buildings should be his leading drawing; it would have made a better centre-piece than this.

1918. "Chapel of St. John, Liverpool Cathedral; interior and exterior:" Mr. Jas. Brooks. Two of the author's remarkable set of Liverpool Cathedral drawings, of which the exterior was illustrated in our pages on March 6, 1886. It is a corner of the proposed cathedral seen at close quarters, and consisting mainly of masses of wall and buttress piled up in a way that the modern architect is seldom allowed to build; hence the half-melancholy satisfaction of doing it on paper.

1919. "Dining-room decoration": Mr. T. W. Hay. A very sumptuous scheme, shown in a good water-colour perspective of the interior, but hung too high for the details to be well seen. It is apparently Greek in detail, with marble pilasters in the lower portion, and what may be either a fresco or mosaic frieze of decorative figures and emblems on a light ground. The ceiling is coffered, with panels decorated in blue and gold. The general effect is rich and sumptuous, but the work (which we imagine is not carried out) would be very costly in proportion to the effect produced. This being a drawing with a high point of sight, is of course stuck up at the top of the hanging line, far above the eye, so as to distort it as much as possible, according to what appears to be an almost deliberate practice in hanging the architectural drawings. One would have supposed architectural R.A.'s might at least recognise the fact that a drawing with a high sight-line requires to be hung low.

1920. "A Drawing-room in the style of the Consulate": Mr. Walter Hensman. A brilliant water-colour drawing of an interior of a large *salon*, in which the author has contrived to produce a fairly harmonious though somewhat gaudy effect in spite of the employment of much strong colour. The walls are divided out by pilasters decorated with Neo-Greek ornament in red; between them the wall has what is probably meant as a gold ground with a broken grey-blue border, and festoons and garlands disporting over the wall. A deep frieze of rich gold scroll-work on a dark ground binds the whole together. The Turkey carpet indicated on the floor is not in keeping with the whole scheme in regard to colour; but that is partly a question of texture of material; that which seems harsh on a smooth surface may be quite softened down on a surface of rough and soft texture; and thus a Turkey carpet will go with almost anything.

1921 "New Church, Barmouth, North Wales; competition design": Mr. T. E. Pryce. We have previously referred to this, which is a kind of design more likely perhaps to be admired than accepted in a competition; the average competition committee would probably regard it as a building in which much stone and labour was wasted in blind walling. The hilly site furnishes an apparent excuse for this, and we have a church with richly-traceried windows in the upper portion of a mass of plain wall, with a crypt or school below, and a flying-staircase arched over the entrance to the lower story for access to the church proper. A lofty double-gabled transept stands out boldly from the nave up to the road line, with buttresses running the whole height of the front, and two large Perpendicular windows in the upper portion. The whole effect is most picturesque, and one quite regrets it has not been built.

1923. "Cottages, village shops, and Convalescent Home, Leigh, Kent": Messrs. Ernest George & Peto. Charming examples of village architecture, with less appearance at trying to be picturesque than is sometimes evident in modern cottage architecture of this class.

1924. "Design for new Market Hall, Rotherham": Messrs. Mitchell & Butler. A very artistic drawing in brown ink, tinted with the brush, showing a block of building with shops and an arched entrance in the ground story, and a frieze decorated with garlands, and with small windows at intervals. The main block of buildings, running to the back at right angles with this, is evidently glass-roofed and louvred, but the glass roof is kept out of the view. Of the practical suitability of the design there is nothing to give information; like No. 1887, it is a picture, and nothing more. This is a drawing with a very low sight line, below the margin of the visible picture, indeed; it is therefore (of course) carefully placed at the *lower* limit of the hanging line, below the eye, and where it can be seen to the greatest disadvantage.

1926. "Proposed Church of the Good Shepherd, Hampstead; interior": Mr. Jas. Brooks. This is a vaulted interior in which the vaulting-ribs spring, without the intervention of capitals, from very thin cylindrical piers, with an abutting vault over the aisles, which are narrow in comparison with the centre, and possibly intended as aisles of passage only. If the piers are really intended to be as thin in proportion as shown here, the construction will be a nice piece of equipoise, and the piers will require careful building. In the drawing the effect is very good.

1928. "Design for Church, Maida Hill; exterior": Mr. John Belcher. This is a large and powerfully-executed water-colour of a design for a church which is hardly, we imagine, likely to be allowed to startle the "respectable middle-class neighbourhood" of Maida Hill, but which is interesting enough in itself, and certainly one of the most original things in the collection. In a red-brick gabled end, rather suggesting in its general outline and proportions a large barn, is an immense deep-set tracery window under a four-centred arch, filling up the whole space between the flanking turrets of the façade; the window has nine lights, but between the five centre and the two outer ones at each side is a large stone buttress flying out on to the porch walls below, thus giving a solid pier in place of a mere mullion at two points in the window. The side towers or wings are marked by some white and red banded work, and over this is a stone stage with mullioned windows, which finishes square, at the foot of the main gable. Below the large window is a stone porch with marble columns, supporting a frieze carved with figures (roughly indicated) with no architrave; at each extremity of the porch is an octagonal bay, apparently containing a staircase, solid beneath, with a window-stage at the top and a low hipped roof. In the rear on the north flank of the church, a plain octagonal tower in brick rises, but above the cornice suddenly breaks into a rich congeries of stone-work, buttresses and arches heaped together in a general spire-like outline, and as if built in as an afterthought. It cannot be said the whole is beautiful; it is far too *bizarre*, the detail wants assimilating, and the whole thing requires refining; but it has the rough elements of an exceedingly picturesque piece of architecture; a sort of thing which one would feel irresistibly impelled to stop and get into one's sketch-book, if one met it abroad. But if built in a London suburb, many of the very people who would sketch it if they met it abroad would only say—"What a queer building!" We are so respectable in England—even in our architecture.

1930. "Staircase decoration, 89, Queen's-gate, Kensington": Mr. J. H. Eastwood. A very pleasant and harmonious piece of decoration consisting of a raking dado of gold foliage on a dull ground, above which is a series of upright trees, of conventional foliage, light blue predominating, on a nearly white ground. A narrow frieze of foliage of a different design on gold ground completes the whole. The only question suggested is whether the "trees" of the middle portion are not somewhat out of scale with the rest: looking at them at first, and before we noticed the section line of the steps, they certainly conveyed the idea of being work on a smaller scale than is actually the case.

1931. "Design for a Clock Tower at Liverpool": Sir A. W. Blomfield, A.R.A. This is a Classic clock-tower of very elegant detail, with an octagonal lantern and spirelet on the top of the square tower. It seems to fail in effect as a tower by being divided up into too many nearly equal stages. If the portion of the height between the rusticated basement and the clock-stage had been treated in one height, it would have had much bolder and more tower-like effect, and the clock-stage, which is the *raison d'être* of a clock-tower, would have been better emphasised.

1934. "The Weigh-house Chapel, Mayfair": Mr. A. Waterhouse, A.R.A. We gave some particulars the other day about the former sites of the King's Weigh-house Chapel building and the history of former buildings bearing that title. (See "Notes," p. 388, *ante*.) A plan would have made the building more intelligible: the chapel portion appears to be an oval on plan, with a tiled roof following the line of the walls, but gathered up at the top into a ridge parallel with the longer axis of the oval. This oval structure stands in the midst of a square formed by one-story buildings with a balustrade on the top, the use of which and the manner in which they work into the plan of the whole cannot be ascertained from the perspective view. There is a tower of very early French look, with triangular-shafted turrets placed obliquely and standing free at the angles of the lantern stage. The suitability of this Gallicised architecture, for a building of this kind on a London site, seems rather questionable.

## ROYAL INSTITUTE OF BRITISH ARCHITECTS.

THE eleventh ordinary (business) meeting of this Institute, for Session 1888-89, was held on Monday last at 9, Conduit-street, Mr. Alfred Waterhouse, R.A. (President), in the chair.

*Additions to the Library.*

Mr. W. H. White (Sec.) announced the receipt of a large number of donations to the Library, including the bequest of books made by the late Mr. C. R. Pink, and several gifts of money. Votes of thanks were passed to the several donors.

Mr. Octavius Hansard said that Mr. Pink's bequest was unique in character, and deserved some recognition from the members. It gave the Institute the privilege of taking every book from Mr. Pink's library of which they had not some edition or other, while the remainder were to go to the Architectural Association. He would, therefore, like to propose a special vote of thanks to the executors for the manner in which they had carried out Mr. Pink's bequest (applause).

Mr. Wyatt Papworth seconded the motion, adding that the bequest comprised nearly 200 different works and editions.

The resolution was agreed to unanimously.

*Election of Council for* 1889-90.

The President then read the report of the scrutineers as to the result of the voting for the Council for 1889-90. The report showed that 521 lists had been sent in, of which twenty-six were rejected as informal, leaving a total of 495 valid lists. The following was the result of the voting:—

*President.*—Mr. Alfred Waterhouse, R.A.

*Vice-Presidents.*—Professor Aitchison, A.R.A.; Mr. John Macvicar Anderson; Mr. Arthur Cates; and Mr. Henry Currey.

*Honorary Secretary.*—Mr. Aston Webb.

*Members of Council.*—Messrs. John Belcher, jun.; Thomas Blashill; James Brooks; Thomas Edward Collcutt; Campbell Douglas (Glasgow); Robert William Edis, F.S.A.; William Emerson; William Milner Fawcett, M.A., F.S.A. (Cambridge); Charles Fowler; James Barlow Fraser (Leeds); Alexander Graham, F.S.A.; Edward Augustus Gruning; Octavius Hansard; John Holden (Manchester); Wyatt Papworth; Edward Cookworthy Robins, F.S.A.; John Slater, B.A. Lond.; and Richard Phené Spiers, F.S.A.

*Associate-Members of Council.*—Messrs. George Richards Julian and Thomas Miller Rickman, F.S.A.

*Presidents of Allied Societies.*—Mr. Henry Crisp, Bristol Society of Architects; Mr. Thomas James Flockton, Sheffield Society of Architects and Surveyors; Mr. Edward Joseph Hansom, Northern Architectural Association (Newcastle); Mr. George Thomas Hine, Nottingham Architectural Society; Mr. Edmund Kirby, Liverpool Architectural Society; Mr. William Alfred Royle, Manchester Society of Architects; and Mr. James Tait, Leicester and Leicestershire Society of Architects.

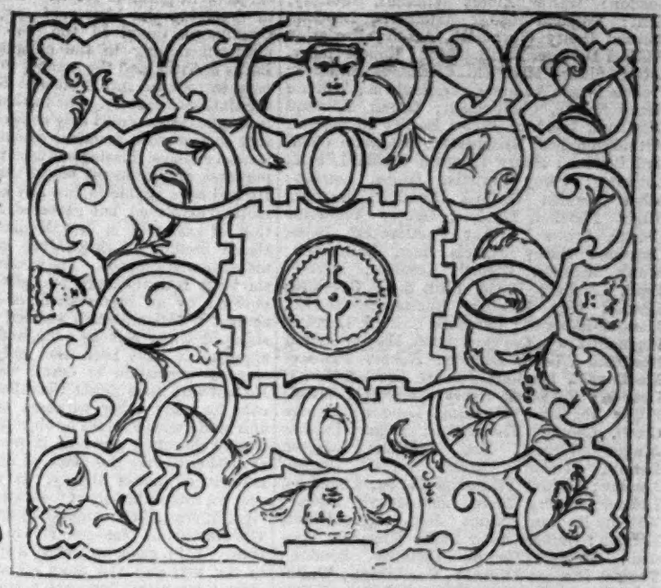
*Representative of the Architectural Association (London).*—Mr. Herbert Duncan Appleton, Fellow, President A.A.

The new Council will thus consist in all of thirty-four members.

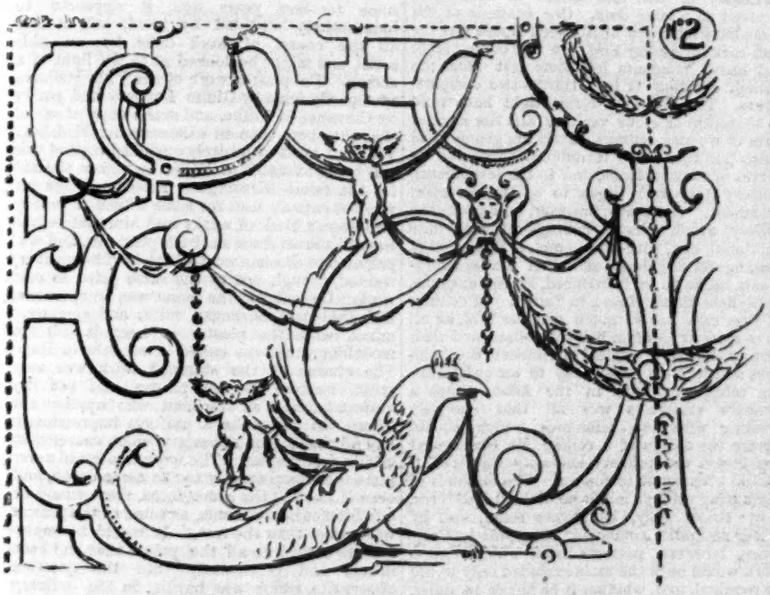
*Election of Standing Committees.*

The President then announced the result of the election of the Standing Committees for 1889-90. Separate committees were elected for Art, Literature, Practice, and Science. Each

PORTION OF CEILING, NEWNHAM, DESIGNED IN SMALL CURVES.



CEILING DESIGNED IN LARGER CURVES.




PART OF COVED CEILING, SLYFIELD HALL.

*Diagrams of Ceilings in Illustration of Mr. Champneys's Paper.*

committee consists of ten Fellows and six Associates.

Votes of thanks were passed to the scrutineers for their arduous labours.

*Election of Auditors.*

Mr. H. S. Legg, Fellow, and Mr. Bernard J. Dicksee, Associate, were appointed auditors for the year 1889-90.

*The Retiring Honorary Secretary.*

Mr. John Belcher proposed a cordial vote of thanks to Mr. J. Macvicar Anderson, the retiring Hon. Sec., for the agreeable and able manner in which he had conducted the duties of his office (applause).

Mr. Henry Currey, in seconding the resolution, spoke of the attention and kindness Mr. Anderson had shown during his term of office, and the very high professional tone of honour he had given to all the proceedings of the Institute (applause).

Professor Aitchison supported the motion.

The resolution was put, and was most heartily received.

Mr. J. Macvicar Anderson, who was received with applause, said that he would be somewhat of a callous and perhaps cold-blooded individual who could listen to such expressions respecting himself as those of Mr. Belcher and Mr. Currey, and the unanimous manner in which those expressions had been received, without some degree of feeling. If, therefore, the words he had to say were few, and not so well expressed as they ought to be on such an occasion, he begged them to believe that it was because, appreciating so highly their kindness, he was unable to express, as he ought, his thankfulness for it. It was now nearly nine years since the members were kind enough to elect him to the position of Honorary Secretary of the Royal Institute of British Architects. At that time he esteemed it a very high honour, and at no time during the period in which he had held the appointment had he ceased to esteem it as such,—for this reason, if for no other: that in carrying out the duties of the office he had been actuated by one single motive only—from no desire to promote personal ambition, but from a pure and sincere wish to promote the honour of the profession of architecture, and of the Royal Institute of British Architects, which was the representative of that profession (applause). During those nine years it had been his happiness and good fortune to be associated with no fewer than six Presidents of the Institute,—the late Mr. Whichcord, the late Mr. Street, the late Sir Horace Jones, Mr. Christian, the late Mr. T'Anson, and Mr. Waterhouse. When he accepted office, he took occasion to refer to his predecessors in the work,—such men as Donaldson, Hayter Lewis, Cockerell, and Wyatt,—and expressed the diffidence with which he ventured the attempt to follow in their footsteps. In vacating the office, he felt that, from the manner in which the motion had been received, he resigned the position as untarnished as he had received it at the hands of his predecessor (applause). He had only one word more to add, and that was to thank the President and his colleagues on the Council,—and, indeed, he might say every member of the Institute,—for the forbearance they had invariably extended towards him in the execution of his office, and for their extreme kindness and confidence on all occasions. He would further say that if there was one consideration which rendered it pleasant for him to vacate the office, it was that he would be succeeded by a gentleman who was sure to maintain the dignity and the honourable and gentlemanly spirit that ought to pervade an Honorary Secretary of the Institute (loud applause).

*The Retiring Treasurer.*

The President remarked that the Honorary Treasurer,—Sir Walter Farquhar,—who was now going out of office, had been the Treasurer of the Institute for upwards of fifty-three years, and by his courtesy he had repeatedly aided the Institute in days gone by when they were in temporary difficulties. They were not likely to get into such a position again, but it, no doubt, would be consonant with the feelings of the members that their best thanks should be given to Sir Walter Farquhar (applause).

*Election of New Members.*

*Fellows.*—The meeting then ballotted for the following Fellows, who were all declared duly elected:—Messrs. George Inskipp (Associate), London; Charles Herbert Shoppee (Associate), London; Richard Chaytor Millar (Associate), Dublin; Arthur Henry Reid (Associate), Johannesburg, Transvaal; Muncherjee Cowasjee Murzban, Bombay; John Cotton, Birmingham; Thomas Drew, R.H.A., Dublin; Alfred Culshaw (Associate), Liverpool; George John Skipper, Norwich; Thomas Cook, Liverpool; Henry Hartley, Liverpool; Arthur Benjamin Plummer (Associate), Newcastle-on-Tyne; William Jackson, Leicester; William Henry Harrison, London; Arthur Sutton Gover (Associate), London; Andrew Thomas Taylor (Associate), Montreal, Canada; Richard Creese Harrison (Associate), 103, Cannon-street; and John Stansfield Brun, Bradford-on-Avon.

*Associates.*—The following forty-four candidates for the Associateship, who had all passed the necessary qualifying examination, were, in accordance with By-law 9, elected *en bloc* by show of hands, viz., Messrs. Charles Oury King,

London; Walter Albert Williams, Bromley, Kent; Edmund Walter Wimperis, London; Richard Henry Weymouth, Acton; Frederick William Dorman, Northampton; Robert Henry, Leeds; Sidney Macefield Fairlie, Manchester; Francis Baugh Andrews, Birmingham; William Henry Stucké, Cheltenham; Robert Edmund Crossland, London; James Barritt Broadbent, Withington, near Manchester; Benjamin Woollard, London; Henry Langton Goddard, B.A., Leicester; Percy Christian Gibbs, London; Allan Ovenden Collard, London; Banister Flight Fletcher, London; Egbert Augustine Crooke, Crewe; Arthur Spottiswood Jones, Croydon; Henry Francis Kerr, Edinburgh; Frank Minshull Elgood, London; Herbert Read, London; David Bird, Sale, Cheshire; Edward Guy Dawber, Bourton-on-the-Hill, Moreton-in-Marsh; Laurence Youngs, London; Reginald Alwyn Crowley, Alton, Hants; Arthur Needham Wilson, London; Robert Falconer MacDonald, London; Francis Thomas Verity, London; Frederick Henry Tulloch, London; Edgar Augustine Hawkins, London; George Orrell, Chorley, Lancashire; Edgar Thomas Ainger Wigram, B.A., London; Langton Dennis, London; Charles Herbert Cooper, London; Francis Fitzadelm Persse, Loughrea, Ireland; Henry Ross, Accrington; Edward William Hudson, London; John Reginald Best, London; Herbert John Philip Kimpton, London; Herbert George Ibberson, London; Thomas Dinham Atkinson, Cambridge; Walter John Tapper, London; Thomas Bradford Ellison, London; and John Clark Stransom, London.

*Honorary Fellows.*—The following gentlemen, hitherto Honorary Members, a class which under the New Charter has ceased to exist, were elected as Honorary Fellows, viz., Dr. Edward Augustus Freeman, Somerleaze, near Wells, Somersetshire; and the Rt. Hon. Sir Henry Austen Layard, G.C.B., D.C.L. (Royal Gold Medallist), London.

### *The History and Uses of Plaster-work, especially as Relating to Ornamental Ceilings.*

Mr. Basil Champneys then read a paper on this subject. At the outset, he disclaimed any attempt to deal exhaustively with the subject, treating it mainly from a practical point of view, and dwelling upon that application of the art likely to be of most importance in the immediate future. As an introduction, he remarked upon the great and increased importance of plaster-work. It was not long since that a certain school of architecture had gone far towards depreciating the plasterer's work as a modern superfluity. It had been formulated that Gothic architecture, being a style of true construction, had in all cases to expose its own anatomy. Plaster on walls, ceilings, or roofs was, according to that misreading of the principles of Gothic architecture, to be rigidly expunged as an anomaly. If that misapprehension had affected original works alone, it would have been comparatively harmless; but it was in restoration that the more calamitous effects were to be detected. Stone walls in restored churches were stripped of their plaster, the joints of the masonry being made conspicuous by pointing, sometimes in mortar of a vivid black; and timber roofs of the tie-beam and king-post type were similarly stripped of their ceilings, and made into open-timbered roofs, reduced by the falsification to mere absurdity. If such action cast plaster into disrepute as a Sybaritic superfinity, not less injurious had been its superabundant and meretricious use in that style, or no style, which until lately had produced the majority of modern domestic buildings. The author, proceeding to give an outline of the origin and history of the art, stated that its origin was lost in antiquity, but plaster-work was known to have been largely used in the temples of ancient Greece, and probably still more largely in domestic buildings. Of Roman plaster-work enough was found to show how extensively it was employed, and to what perfection its decorative uses had attained. All the work unearthed in Rome, Pompeii, and Magna Grecia was exclusively hand-modelled, but casting in plaster was not unknown. The art lapsed with the Roman Empire, but its influence survived in the East, whither it had travelled, and, through the Renaissance, Roman examples were indirectly the origin of all post-Gothic European work. Its revival as an architectural accessory occurred at the close of the fifteenth century, but the earlier Renaissance sculptors had employed plaster for bas-reliefs of religious subjects in portable forms. Having referred in detail to the history of *sgraffito* art, Mr. Champneys described the re-discovery of plaster-modelling in the exhumation of the Baths of Titus, and the manner in which it had been introduced into Northern Europe during the sixteenth century. The further development in England was traced only so far as was necessary to the more practical discussion of ornamental ceilings. Plaster was used in England for purposes of adornment before the Renaissance. He had been unable to find any account of the method employed, but gathered, from examination of examples in late Mediæval churches, that a method of simplifying intricate workmanship was adopted. The woodwork in which the large features were wrought by hand was covered by an incrustation of some sort of cement or plaster, which seemed to have been stamped when soft by a die, and that method appeared to have been used only where a considerable repetition of detail was admissible. He had very little doubt that the material was used for many other purposes besides screens and stalls, and could see no objection to its use in Gothic churches, provided it were so employed as neither to take the place of nor imitate any material of greater dignity. It was to ceilings that the further history of the art would be of principal interest, both practically and historically. The erection of Nonsuch House in the time of Henry VIII. gave, no doubt, a special impetus to the art, and the more elaborate forms of plaster ornamentation were posterior to it. He thought, however, that a simpler form had been previously in use, and traces of that form survived to a later date. One example of the immediate influence of Nonsuch House was the Fish-room of Audley End. In that ceiling large and heavy pendants fell some feet from the ceiling, dividing it into thirty-two compartments. The elaborate form might have been an imitation of stone vaulting and the simpler form of wooden ceilings. Intricate geometrical forms had then been introduced, succeeded by curves of various kinds, and in the seventeenth century strap-work began to be the prevalent ornament. There was, however, no limit to the variety which plaster ceilings of that date exhibited, and, with the complete liberation of line, figures of animals and other similar adornments began to be introduced, as, for example, at Slyfield Manor House, in Surrey. Of ceilings of later date not so much need be said, as all were more or less familiar with them, and their history showed a gradual decadence, the boldness and freedom giving way to an uninteresting refinement, until in the Adam times a delicate prettiness was all that survived. Dealing with the principles which should govern the design of a ceiling, Mr. Champneys considered the primary necessity was that it should give repose to the eye. The methods of decorating ceilings might be divided into three,—by colour only, by simple relief, and by colour and relief combined. For practical purposes, however, patterns from which figure-work would be in the main excluded only would be required, and, whether it be flat or in relief, moderation and repose should be observed. If colour only were used, it should be harmonious, and with but little difference between the pattern and the groundwork. If relief, the relief should be low. The pattern ought not to lead in any one direction, and if it did, it must be either from the cornice towards the centre, or *vice versâ*. Rectangular patterns militated against repose, and were less fitted for ceilings than more flowing ones. Having stated in detail the reasons for the above and other principles to be observed in designing ceilings, the author proceeded to treat of the methods of workmanship, of which the following were the three principal modes in vogue at the present time. The first was to lay a flat surface of plaster and build the ornament upon it; the second was to cast the entire ceiling in sections from a clay model; the third was to work the ornament in the plaster while it was soft and malleable. The first had, he believed, no authority in antiquity, nor was it satisfactory; and the choice was between the two latter, which were described fully by the author, and admitted of precisely the same good results, although the last was attended by far greater difficulties, which all led to a great increase of cost. It was generally believed to be the ancient method; he had, however, found evidences that it was not invariably so, and thought the usual method was a combination of the two processes; the leading ornament being cast and placed in position on the soft plaster on which the subordinate features were modelled. In conclusion, Mr. Champneys mentioned that those who sought for motives for similar types of design to those he had advocated would find abundant suggestions in old book-plates of the sixteenth and seventeenth centuries.*

Professor Aitchison, A.R.A., in proposing a vote of thanks to Mr. Champneys for his extremely interesting and valuable paper, said it was rather treading on the heels of the sculptor, as, in his opinion, the subject did not belong to architects at all, though it was none the less interesting. The subject was so large, and had been treated so fully by Mr. Champneys, that it would be impossible, at that late hour of the evening, to enter into any consideration whatever of the various statements and theories which had been put before them. At the same time, he would like to say a word or two. Although he generally preferred to have flat plaster-work on the ceiling, this liking could not be converted into an axiom, for high relief was quite as effective in its proper place. The best treatment depended on the height and decoration of the room, and the depth of the coffers. Much of the ornament done in the time of Inigo Jones, and even so late as that of Sir William Chambers, was fruit and flowers in high relief, evidently moulded by hand, because where those were taken down the marks of the plasterer's fingers on the leaves and of his thumb on the fruit could be seen. Perhaps the most beautiful specimen of plaster-work he had ever seen was in a vaulted chamber in the Villa of Hadrian near Rome. On his last visit he was unable to see it, but when he inspected it some fourteen years ago, it appeared to him entirely moulded by hand, and it had all the charm of work done by an able artist, and might be looked at in the light of a sketch. The plaster work of the Villa Madama was partly done by Giulio Romano and partly by Giovanni da Udine, and was a copy of one of the chambers then in existence at Hadrian's Villa. A most exquisitely modelled copy of this was being executed at Rome by Signor Mariani for the South Kensington Museum. The art was not entirely lost, for some fifteen or twenty years ago a clerk of works told him that he had learned the art from an Irish plasterer, and was prepared to do some work which he (the speaker) wanted, though not at the same price as cast work. He believed the secret was an open one, and that treacle, sugar, milk, and size were mixed with the plaster to keep it soft for modelling, and was called *gesso duro* in Italy. The charm of the stamped work was very great, because as the plaster did not dry uniformly, and as the man who applied the stamp did not make a uniform impression, it had all that charm of variety which cast-plaster could never possess. The workman could never press the stamp exactly to the same depth, and even if he used the same force there would be a difference in the result, as some of the plaster was harder than the rest. It would be impossible to enter into all the points that had been raised, and particularly into the question of *sgraffito*, which was hardly, in the ordinary sense, plaster-work. *Sgraffito* work could be done at no very great cost, the great thing being to obtain a design from an able artist, because almost any skilful decorator could execute it. The plaster-work at Hadrian's Villa was similar in treatment to the best decoration on the silversmiths' work of the Treasure of Hildesheim,—supposed to have belonged to Varus, and was quite equal to the best Renaissance work. The members were deeply grateful to Mr. Champneys for the admirable paper he had given. In that paper he deplored that the genius of the nineteenth century was mainly devoted to forgery. Well he (the speaker) had been travelling about England, and certainly found that in the shape of stained-glass it had been carried to such an extent that it might deceive anybody; it was difficult to say that the work did not belong to the fifteenth or sixteenth century, instead of to the nineteenth. In the ruined part at Hardwicke Hall was an admirable example of the methods used at the time. The parts in high relief were blocked out in coarse plaster, and finished with fine; but whether this last coat was cast or moulded by hand he could not say.

Mr. John Slater, B.A., seconded the resolution, adding that the paper had opened up a

* We give reproductions of three of the diagrams shown by Mr. Champneys; one a bit from an old ceiling at Slyfield Hall; the other two are intended to illustrate the desirability of large and bold curves in design of this class, rather than smaller local curves.

very wide and attractive subject, which it was much too late, at that hour, to descant upon. He would only like to say that Mr. Champneys had not mentioned one beautiful *motif* of sixteenth-century plaster-work,—the introducing into ceilings of the badge or emblem of the family for whom the work was done. As one instance he might mention the mulberry, which was extensively used at Loseley as the badge of the More family. It was curious to see how, in some interesting examples, people had been anxious to make the plaster appear as woodwork, and in one old hall in Essex,—Horham Hall,—where some years ago he had some alterations to make, he found that what were apparently oak beams in the elaborate ceiling of a bedroom were plaster, which had been grained and varnished to resemble oak.

The vote of thanks was then put and carried by acclamation.

Mr. Champneys, in reply, thanked the members for the attention they had given to his paper. The subject was one about which he might have gone on almost *ad infinitum*, and he had only intended to touch a few of the most important points, which he was glad to find had interested them so much.

The President then announced that on Monday, the 17th instant, the Royal Gold Medal would be presented to Sir Charles Newton, K.C.B., and a paper would be read by Professor Baldwin Brown, Honorary Associate, on "Recent Advances in the Study of Architectural History."

The proceedings then terminated.

## THE ARCHITECTURAL ASSOCIATION:

### VACATION VISIT TO ETON COLLEGE.

THE first vacation visit this season was made on Saturday last, June 1, to Eton College. About thirty members assembled at Waterloo Station, and proceeded by the two o'clock train to Windsor. Here they were joined by a few others, who had travelled by earlier trains.

The party at once proceeded to the College, where they were received by Mr. H. E. Luxmoore, M.A., one of the College masters, who, assisted by one of his colleagues, undertook to show the members over the old buildings.

Brewhouse-yard was the first part visited, whence a good view is obtained of the east end of the Chapel, and attention was directed to the curiously distorted form of the outer arch of the window. It is supposed that it was originally intended to have constructed a window of a more pointed form, for which the stones were prepared; owing, however, to the troubles at the close of the reign of Henry VI., this was not completed until a later time, when the design was modified, and a flatter arch adopted. The funds being inadequate, the old stones were used, with the result that the inner and outer curves do not agree.

Turning to the north side of the Courtyard, the exterior of the Hall was noticed. This is probably the oldest existing portion of the buildings. There are evident indications that it was originally intended to have formed a much loftier building than at present exists. The work of the founder, Henry VI., extends to the height of the masonry. The building was left untouched during the interval in which the Wars of the Roses took place, after which Edward IV. caused the walls to be carried a few feet higher and completed in brickwork. The existing brickwork probably belongs to the eighteenth century, but merely replaced the older work.

It should be remembered that Edward IV. endeavoured to deprive Eton of the endowments conferred on it by his Lancastrian predecessor, and actually obtained a Papal Bull sanctioning the union of Eton with Windsor. He also took from the College much of its valuable property, such as plate, tapestry, &c. These were, however, ultimately restored, and Edward lent some assistance to the completion of the buildings.

Leaving the Brewhouse-yard, and passing through some of the older parts of the building devoted to larders the kitchen was reached. It is a fine example of this class of building, octagonal on plan and with lofty open roof, and lantern-light above. The kitchen was rebuilt in 1508. The cook is very proud of the mechanical "Jack" for turning the spit. It is dated 1535. The work in this kitchen is confined to providing for the seventy scholars on the Royal Foundation.

The interior of the Hall was next visited. The "screens" are at the east end, with approaches from the cloisters, the "dais" at the west end, with communication with the Provost's apartments. The fireplaces, three in number, are original, but were not discovered until a few years ago, when the panelling was removed in making some alterations. They had not been used, and the chimneys never completed. The position of one, viz., at the back of the "dais," is somewhat unusual.

In the Library the visitors inspected the fine collection of ancient Charters, Papal Bulls, and other documents which belong to the College. Among them, one generally known as the will of King Henry VI., although strictly speaking it is not a "testament," but simply what its royal author calls "My wille and myne entent" as to the arrangement and completion of King's College Cambridge and Eton College. In leaving the Library the members were conducted through the Upper Cloister, from which access to the private rooms of the Fellows is gained, the servants' entrances and inferior rooms being on a level with the open cloister below. Many of the doorways retain their original oak doors, studded with nails, and in some cases the original iron handles remain. Two large rooms in the Provost's lodgings were next visited, where are some fine fragments of old glass; also a large painting representing a "bird's-eye" view of Venice, presented by Sir Henry Wotton, who became Provost after his return from Venice, where he was sent as ambassador by James I. It was while Provost of Eton that Sir Henry published his "Elements of Architecture" from materials collected while in Italy.

Returning through the Lower Cloister, and passing under the great gateway, the main quadrangle was reached.

The bronze statue of Henry VI., was erected by Provost Godolphin in 1719.

The Chapel was next visited, attention being directed to the fine original work in the room now used by the choristers. On passing into the Chapel itself it was explained that what now exists is only the choir of a large church which it was originally intended to build in the place of the earlier parish church which was pulled down. From documents now in the library it appears that the projected church would have been nearly 300 ft. long. The question as to whether it was originally intended that the chapel should have a stone vaulted roof was discussed. The large exterior buttresses and the stone vaulting-shafts seem to indicate such an intention, but some writers explain that the chapel is raised to prevent inconvenience from floods, and that the buttresses are required to counteract the outward thrust of the earth enclosed below the floor level. While mentioning the chapel buttresses it will be remembered that the pattern of the "Eton" fives-court is taken from the space between these buttresses, where the game was originally played. The space above the stalls was at one time decorated with fresco painting, of which all but some very small portions have been unfortunately destroyed.

The Upper and Lower Schools were afterwards visited, and the garden front of the College inspected from the Fellows' garden.

The party then took leave of their guides, and proceeded to visit the new buildings now in course of construction, from designs by Sir Arthur Blomfield, A.R.A. These are arranged on three sides of a quadrangle, two sides being occupied by class-rooms, and the third by a small chapel.

On the ground-floor level, the rooms are approached from an open cloister. The principal room on this level is the Science Lecture Theatre, adjoining which is a chemical laboratory, in which arrangements are made for delicate experiments, where freedom from vibration is necessary, by two piers of brick carried 8 ft. below the floor level; these are to be surmounted with granite blocks. There are some smaller class-rooms on this level. On the first floor are the Museum and Curator's room and the Art Class-room, the roof of which is to be decorated by the students. The chapel is hardly sufficiently completed to judge of its effect.

The school buildings are executed in red brick with stone dressings, while the chapel will be entirely faced with stone externally.

**Monument to Herr Krupp.**—A monument to Herr Krupp is to be erected at Essen, at a cost of 5,000*l.* A prize of 100*l.* is offered for the best design.

## THE INSTITUTION OF CIVIL ENGINEERS:

### ANNUAL GENERAL MEETING.

THE annual general meeting of this Institution, to consider the Report of the Council and the annual statement of the accounts, and to elect the Council and officers for the ensuing year, was held on Tuesday, the 28th ult., Sir George B. Bruce, the President, being in the Chair.

The Report stated that the Institution included within it civil engineers of every denomination; but at the same time the Council made a rigid inquiry into the qualifications of all candidates seeking membership, while no person was admitted a Student unless he could produce evidence of a competent knowledge of certain elementary subjects of general education.

Considerable attention had been devoted by the Council to the composition of its own body, it having been thought that a more rapid change would be beneficial to the interests of the Institution; but the Council had been unable to take any decided steps in the matter. On the other hand, it was considered advisable that the Presidentship should be held by the same person for two successive years, instead of one year, as had generally been the case recently.

The number of members of all classes on the Roll of the Institution on March 31 was 4,739, being an increase of 4 per cent. in the twelve months. The numbers were thus distributed:—Honorary Members, 19: Members, 1,657; Associate Members, 2,613; Associates, 450. At the same date there were 989 Students on the register.

There had been twenty-five Ordinary Meetings, but only fourteen Papers had been read and discussed, for some of which the Council had made the following awards:—A Telford Medal and Telford Premium to Mr. G. Kapp; Watt Medals and Telford Premiums to Mr. W. H. Greenwood and Dr. C. E. Emery; a George Stephenson Medal and a Telford Premium to Mr. E. Worthington; and Telford Premiums to Messrs. J. A. F. Aspinall and J. O. Arnold; and for Papers to be printed in the Proceedings without being discussed:—A Watt Medal and a Telford Premium to Mr. R. Runeberg; and Telford Premiums to Messrs. B. Donkin, jun., Prof. V. A. D. Dery, R. H. Smith, L. F. Vernon-Harcourt, G. Lopes, and N. Kennedy.

Twelve Supplemental Meetings for Students had been held, which had been well attended, and thirteen Papers had been read and discussed. A Miller Scholarship had been assigned to Mr. E. C. de Segundo, and Miller Prizes to Messrs. H. B. Ransom, W. W. F. Pullen, J. D. Twinberrow, S. Joyce, R. J. Durley, J. King-Salter, C. H. Gale, and V. W. Deives-Broughton.

The late Mr. T. R. Crampton had bequeathed 500*l.* in trust to the Institution, the interest to be devoted annually to the purchase of a medal or books, to be called the "Crampton Prize," for the best Paper on "The Construction, Ventilation, and Workings of Tunnels of considerable Length," or, failing such a paper, for a communication on any other subject that the Council might select.

The gross receipts for the year had amounted to 21,763*l.* 18s. 4d., including income, 17,400*l.* 13s. 3d.; capital, 3,840*l.* 18s.; and trust funds, 522*l.* 7s. 1d. The total expenditure had been 18,226*l.* 6s. 4d., including income, 13,972*l.* 8s. 9d.; capital investment, 3,901*l.* 9s. 3d.; and trust funds, 352*l.* 8s. 4d. The difference between the receipts and payments was accounted for by the larger balance at the bankers' at the close of the last financial year. The total investments amounted to 98,042*l.* 13s. 10d.

The promoters of the Westminster (Parliament-street, &c.) Improvement Act had not yet carried out the stipulations in the Act for the protection of the interests of the Institution, and had asked for an extension of the period for doing so, which the Council had granted.

At the instigation of the Council, Her Majesty's Office of Works had undertaken to record the name of the engineer, Thomas Telford, first President of the Institution, on the structure of the Menai Suspension Bridge.

In conclusion, the Council referred to the Exhibition which had been opened under the auspices of the French Government, and which could not fail to attract all who were interested in engineering progress. The projected visit to France of many American engineers, who had promised to accept on their way the hospitality of their professional brethren here, would add

greatly to the interest of the season. The establishment, in connexion with the Exhibition, of a series of congresses on scientific subjects, was likely to be productive of much good, by developing new and valuable views on the subjects treated. Many of the leading members of the engineering profession had been invited to take part in these meetings, and the Council was sure that the Institution of Civil Engineers would meet there with due recognition.

The adoption of the report was moved, seconded, and carried, and it was ordered to be printed in the Minutes of Proceedings. Hearty votes of thanks were then passed to the President, to the Vice-Presidents, and other members of the Council, to the Auditors, to the Secretaries and staff, and to the Scrutineers.

The ballot for Council resulted in the election of Sir John Coode, K.C.M.G., as President; of Mr. G. Berkley, Mr. H. Hayter, Mr. A. Giles, M.P., and Sir Robert Rawlinson, K.C.B., as Vice-Presidents; and of Mr. W. Anderson, Mr. B. Baker, Mr. J. W. Barry, Mr. E. A. Cowper, Sir James N. Douglass, F.R.S., Sir Douglas Fox, Mr. J. C. Hawkshaw, M.A., Mr. C. Hawksley, Sir Bradford Leslie, K.C.I.E., Mr. G. F. Lyster, Mr. J. Mansergh, Mr. W. H. Preece, F.R.S., Sir E. J. Reed, K.C.B., F.R.S., M.P., Mr. W. Shelford, and Mr. F. W. Webb, as other members of the Council.

The Session was then adjourned until the second Tuesday in November, at 8 p.m.

## THE FORCED PERCOLATION OF WATER THROUGH CONCRETE.

### SOCIETY OF ENGINEERS.

AT the meeting of the Society of Engineers held at the Town Hall, Westminster, on Monday evening last, Mr. Jonathan R. Baillie, President, in the chair, a paper on the "Forced Percolation of Water through Concrete" was read by Mr. Henry Faija, M.Inst.C.E.

The author first referred to the paper which he read a year ago, "On the Effect of Sea Water on Portland Cement," and, after mentioning the reasons which actuated him in carrying out these experiments, described the means he had adopted in order to assure the accuracy of his results.

The head of water adopted was 21 feet, equivalent to a pressure of about 9 lbs. per square inch; this head was obtained by erecting a tank on the second floor, from which pipes were led to the ground floor, the pipes being terminated with screw couplings, to which the clamps which held the briquettes could be attached. These were so arranged that the water was forced to pass through the centre or smallest part of the briquette, where fracture would take place when tested; this arrangement, which was thought imperative, necessitated the sides or walls of the briquette being made water-tight, which water-tight covering had to be removed before the briquette could be tested. It was found by experiment that this treatment reduced its strength by 12 per cent. The clamps were of such form that the water could be forced through the concrete in either direction, and arrangements were made by which the amount of water which passed through each briquette could be measured.

In all, nearly one hundred experiments were carried out, the briquettes being, in all cases, gauged in the proportion of 3 parts of standard sand to 1 part of cement, and in order to render the experiment complete, each series consisted of ten briquettes, gauged and treated in the following manner:—

A. Gauged with sea water, and placed under a pressure of sea water.
B. Gauged with sea water, and placed under a pressure of fresh water.
C. Gauged with sea water, and placed in a tank of fresh water, where it remained until tested.
D. Gauged with sea water, and placed in a tank of sea water, where it remained until tested.
E. Gauged with sea water, and left in air.
F. Gauged with fresh water, and placed under a pressure of sea water.
G. Gauged with fresh water, and placed under a pressure of fresh water.
H. Gauged with fresh water, and placed in a tank of fresh water, where it remained until tested.
I. Gauged with fresh water, and placed in a tank of sea water, where it remained until tested.
K. Gauged with fresh water, and left in air.

The primary matter to ascertain was the comparative tensile strength of the briquettes treated in these different ways, the whole of each series being tested at the same date, the date being determined by the cessation of all filtration, in either direction, of water through those which were under pressure. Four different cements were used, which, beyond being assured sound, were in no way selected, so that the following average results of the tensile strength developed may be considered characteristic of the different treatments to which the briquettes were subjected.

AVERAGE TENSILE STRENGTH.

| | | With 12 per cent. added. |
|---|---|---|
| A | broke at 452 lbs. | 506 lbs. |
| B | ,, 358 ,, | 400 ,, |
| C | ,, 348 ,, | |
| D | ,, 354 ,, | |
| E | ,, 392 ,, | |
| F | ,, 405 ,, | 453 lbs. |
| G | ,, 372 ,, | 416 ,, |
| H | ,, 417 ,, | |
| I | ,, 388 ,, | |
| K | ,, 378 ,, | |

The average time during which the briquettes remained sufficiently porous to allow of the filtration of water was eighty-eight days, and the average amount of water which filtered through each briquette was 271 ounces.

The author then discussed the chemical side of the question, and, in a voluminous appendix, gave the analyses of the different cements used in the experiments, and of the briquettes, both before and after filtration, deducing therefrom the amount of lime and other matters dissolved out of the cement, and the amount and nature of the deposition which eventually filled the interstices of the concrete and stopped filtration, and, whilst admitting the value of a correct chemical knowledge of the subject, maintained that the all-important one, to the engineer, was the satisfaction of knowing that, with a good and properly-used cement, no deterioration took place through the forced percolation of water, whether sea or fresh, and concluded by saying that the results of his experiments must be as surprising to everybody as they were to himself. He did not hold with the theory that any deterioration would take place, but he certainly did not expect to find that the cement and the strength of the concrete were actually improved by the intermittent and forced percolation of water through it.

# Illustrations.

## ST. JOHN'S CHURCH, BARMOUTH.

A FINE elevated site for this new church has been obtained on the hill-side facing the sea,—a gradual slope up of the road giving easy access to the porches at the west end.

In plan the church consists of nave and side aisles, divided by piers and arches; choir, and chancel, with morning chapel on north side of choir, and vestries, with organ-chamber over, on the south. Over the choir is the tower, 34 ft. square outside, and rising 100 ft. high, from the base of its elevated position. With a view to meeting the large influx of visitors in the summer months to this favourite watering-place, the church has been designed to seat 1,000 persons.

It was at first intended to erect a smaller and less costly church, but Mrs. Dyson Perrins, of Plas-Mynach, near Barmouth, having generously intimated to the Rector that she would build the chancel, tower, side chapel, and vestries, to the memory of her late husband, this has led to a more ornate structure being erected, and will enable the parish to devote their efforts entirely to the nave and aisles, towards which Mrs. Perrins' son contributes the oak seats, whilst other members of the family make special gifts to the church.

The whole of the work will be carried out under the direction of the architects, Messrs. Douglas & Fordham, of Chester.

## NEWNHAM COLLEGE, CAMBRIDGE.

THIS group of buildings now accommodates about 150 resident students, besides principals and tutors. It contains besides a dining-hall, which is planned for 200, a library common to the three halls, a gymnasium, laboratory, and a hospital.

The original hall, now known as "Old Hall," was originally designed in 1873, for 22 students, but has been twice enlarged. The second in order of erection is now known as "Sidgwick Hall." It was originally built in 1880 for 35 students, and subsequently enlarged to hold 50 students. "Clough Hall," commenced in 1886, and completed last year, is built for 50 students, and the rooms are generally larger than in the other halls. A cloister connects it with the adjoining Sidgwick Hall.

The general system is that of associated halls. Each is complete in itself, and has its own dining-hall, common-rooms, &c.

The new dining-hall at Clough Hall, however, serves also for the occasional accommodation of all the students of the College. The library is in the Old Hall, and Sidgwick Hall has lecture-rooms, with separate access for non-resident students. As no such increase of students as has taken place was originally contemplated, the grouping of the buildings, as each addition became necessary, has been a matter of some comparative difficulty.

Messrs. Bell & Sons, of Cambridge and Saffron Walden, have been the contractors for the entire work. The architect is Mr. Basil Champneys.

The drawing from which the illustration is taken is hung in the Architectural Room at the Royal Academy.

## CHELSEA FREE LIBRARY COMPETITION.

WE publish the principal front and the principal floor-plan of the three premiated designs in the recent competition for the Chelsea Free Public Library. A plan of the principal floor of each is appended.

### *First Premiated Design.*

This is by Mr. J. M. Brydon. The following extracts from Mr. Brydon's report will explain the intention of the design:—

"The entrance to the building is in the centre of the Manresa-road front. A short but wide corridor leads directly to all the rooms on the ground-floor, comprising the news-room, the lending-library, the ladies' room, and the boys' room, with the Librarian's room in their midst, and all overlooked by the librarian or his staff.

The principal news-room may be said to be arranged in two main sections, the first, nearest the entrance, for newspapers; the second, and more retired, for magazines. It affords accommodation for 116 readers at the tables, and 100 at the newspaper-desks, or a total of 216, allowing 15 square feet to each person, without any crowding.

Alongside the news-room is the lending-library, from which the staff can overlook the former at all times.

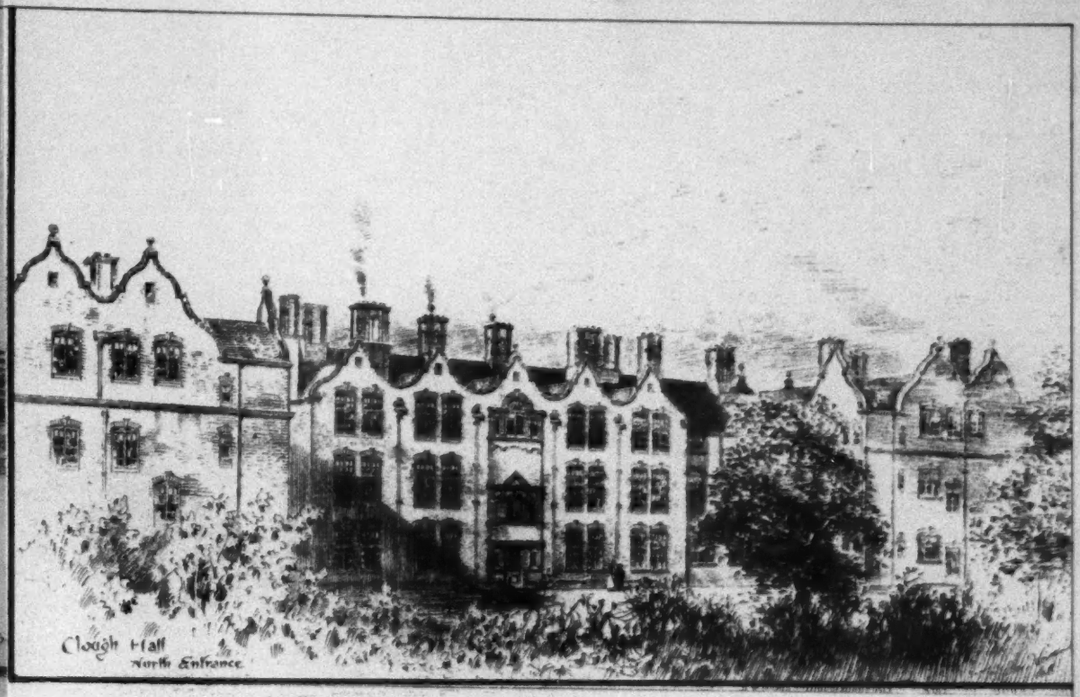
The accommodation for books obtained is for 22,230 vols. on the floor of the library, and 7,290 vols. in the gallery; or a total of 29,520 vols. at 9 vols. to the square foot. Ample waiting space is also provided for the public, with four indicators on the counter for 20,000 vols.—5,000 in each.

Direct access to the book stores above, and the work-room below, is secured by the staff staircase in the centre of the group. The Librarian's room is in direct communication with the lending-library, and overlooks the boys' room in front. The ladies' room occupies the remaining apartment on the ground-floor. It will thus be seen that all the rooms to which it is important there should be short and easy access for the public are on the ground-floor.

A staircase,—commanded from the Librarian's room,—leads to the reference-library on the first-floor. This is lighted from each end, and by a dome-light in the centre, and has a gallery for books all round. Tables are provided for 72 readers; and book space for 7,200 volumes round the room on the floor, and 8,720 volumes in the gallery, or a total of 15,920 volumes, at eight volumes per square foot. It communicates directly with the book-stores in the rear. In order to guard against all chance of damage to the books from damp, it was decided, after careful consideration, to put no book-store in the basement. They are, therefore, all on the first-floor. Two book-stores will give accommodation for 28,800 volumes, at eight volumes per square foot; and two for 30,780 volumes, at nine volumes to the square foot. It will thus be seen that book-case space is provided for a grand total of 105,020 volumes, exclusive of the spare room on the second-floor.

It is proposed that the front portion shall be of red brick with stone dressings, and all the remainder behind the small side wings of stock brick—the roofs to be covered with slates.

The principal apartments on the basement and ground-floors, and the reference library on the first-floor, are proposed to be laid with wood-block flooring, the floors themselves being of fire-proof construction throughout. The entrance-hall on the ground-floor is intended to be paved with cement mosaic, and the staircases to be of stone, except the staff-stairs, which will be of iron, with wood-block treads. The dado under the window-sills of news-room is intended to be lined with glazed pattern tiles,—a great advantage on the score of cleanliness, and decorative besides. The walls above the dado

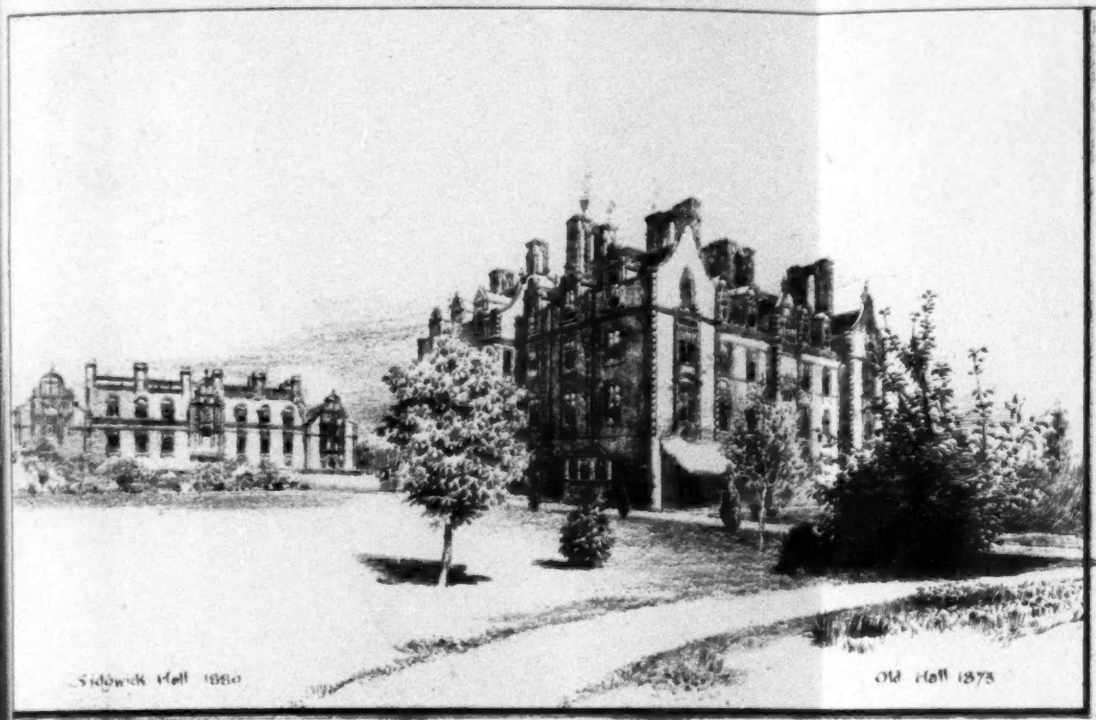


Clough Hall
North Entrance

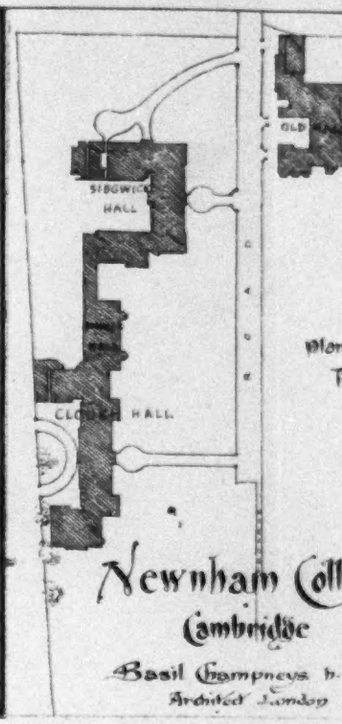
A General View from the South

Sidgwick Hall 1914

"THE PHOTO," SPRAGUE & CO., 22, MARTINS LANE, CANNON ST., LONDON, E.C.



Sidgwick Hall 1880 Old Hall 1873

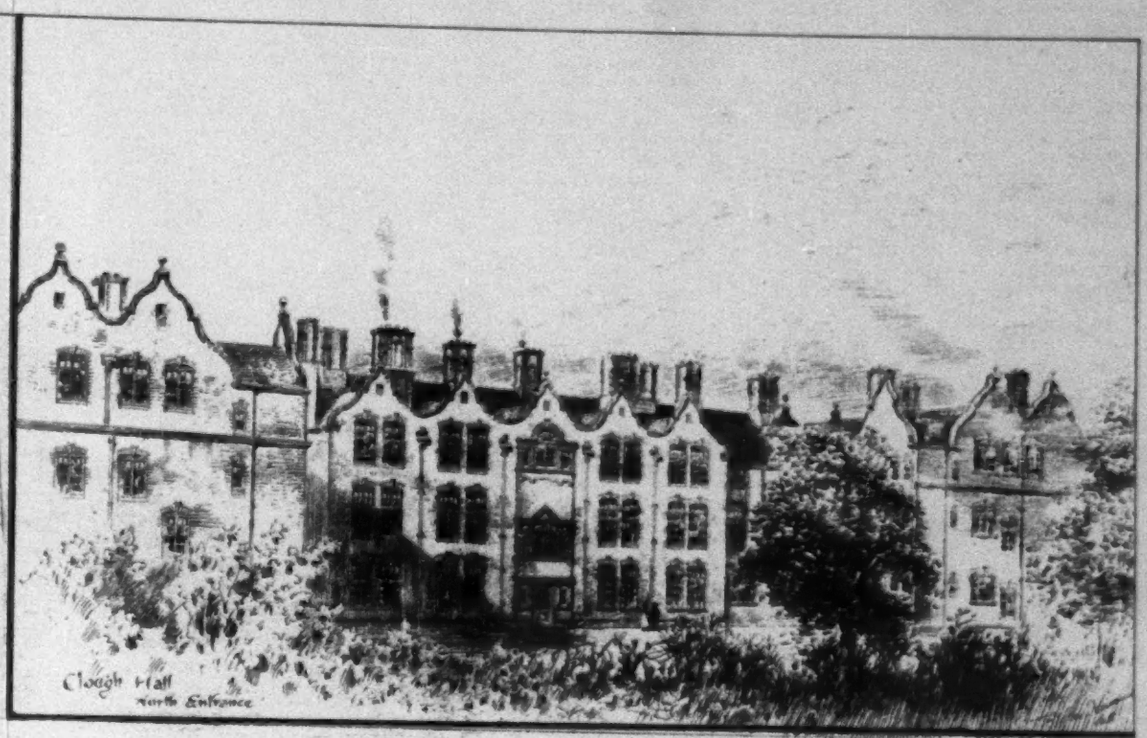



Newnham Coll
Cambridge
Basil Champneys
Architect London

Clough Hall 1910

Plan of
The Site

College

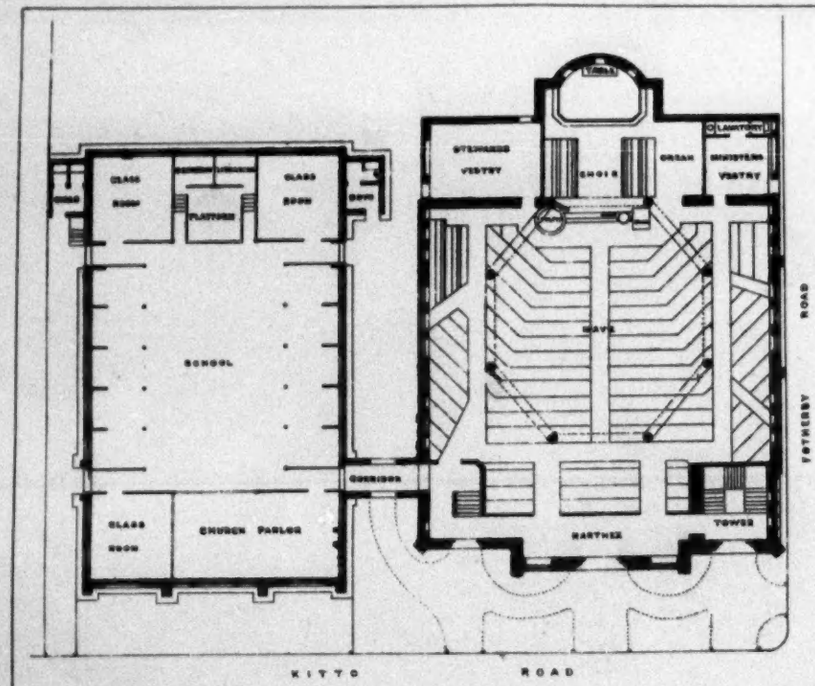


Clough Hall
North Entrance

A General View from the South

Sidgwick Hall 1898

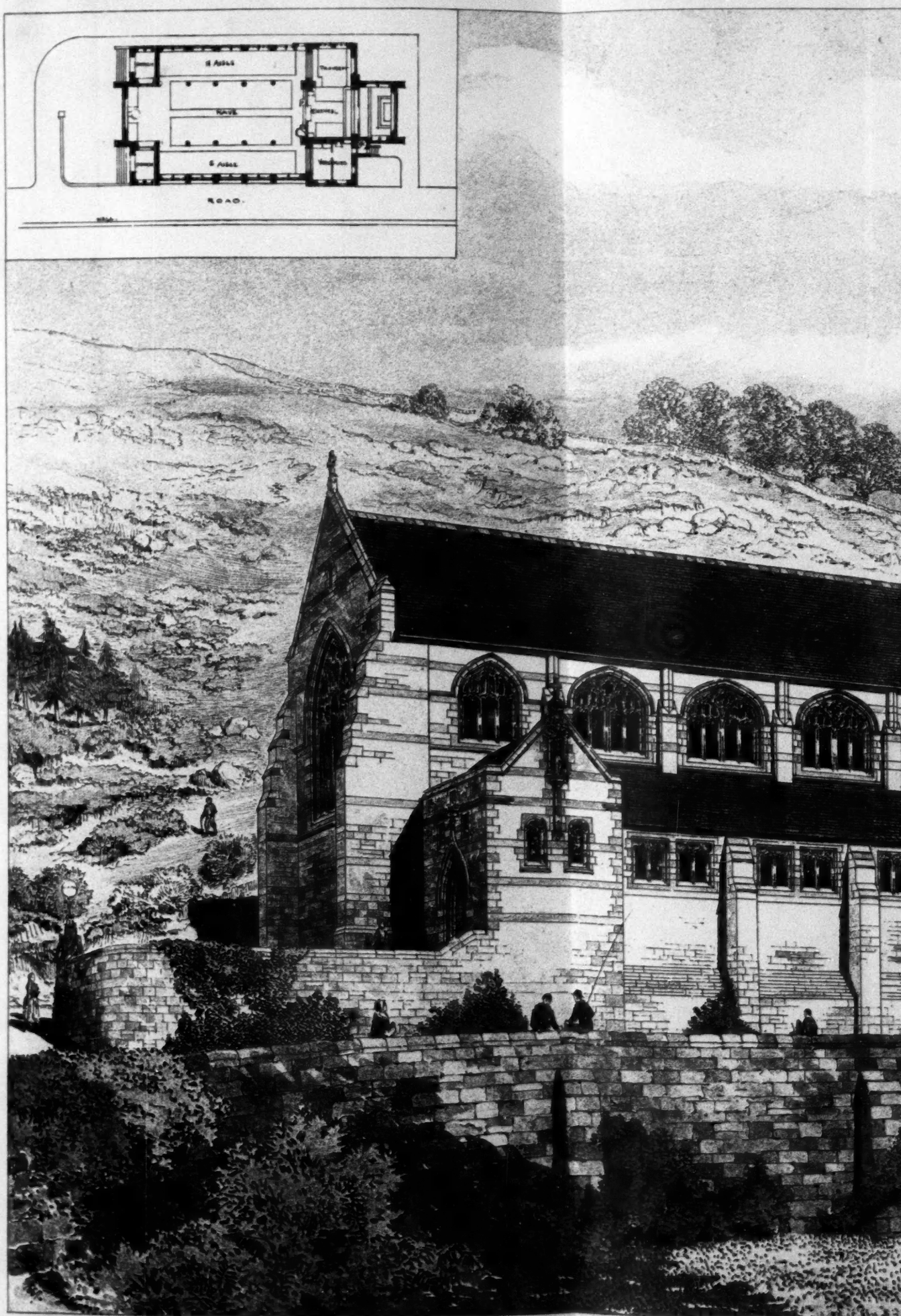
THE PHOTOTYPE SYNDICATE 6 CLIFFORD'S INN, FLEET STREET, LONDON, E.C.


CLASS ROOM
PLATFORM
CLASS ROOM
OFFICE
SCHOOL
CLASS ROOM
CHURCH PARLOR
CORRIDOR
VESTRY
CHOIR
ORGAN
MINISTERS VESTRY
NAVE
NARTHEX
TOWER
FOTHERBY ROAD
KITTO ROAD

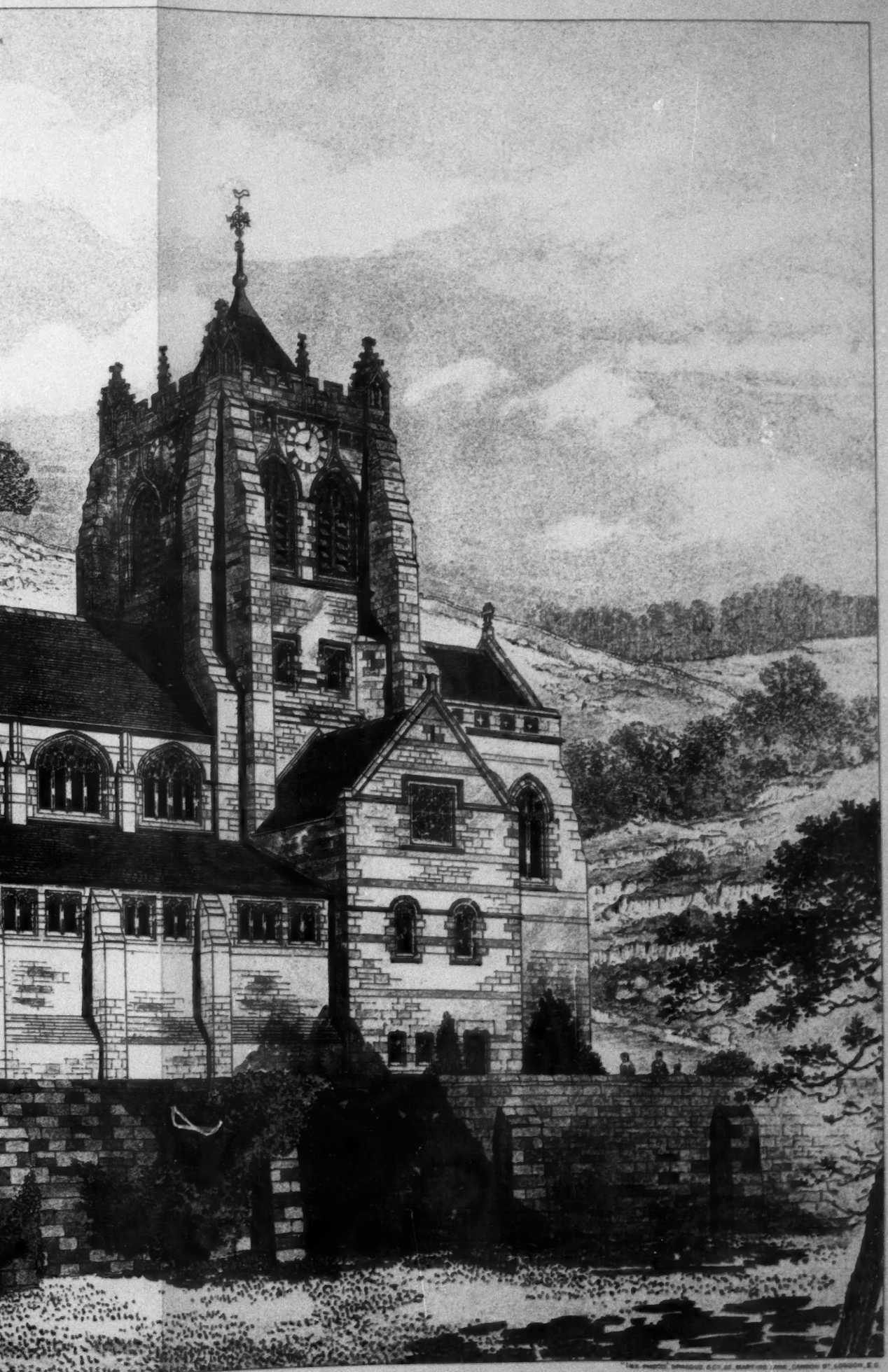
WESLEYAN · CHAPEL · AND · SCHOOLS · KITTO · ROAD · PECKHAM ·

E · HOOLE · F.R.I.B.A. ARCHITECT ·

PHOTO-LITHO. SPRAGUE & CO. 20, MARTINS LANE, CANNON ST., LONDON, E.C.

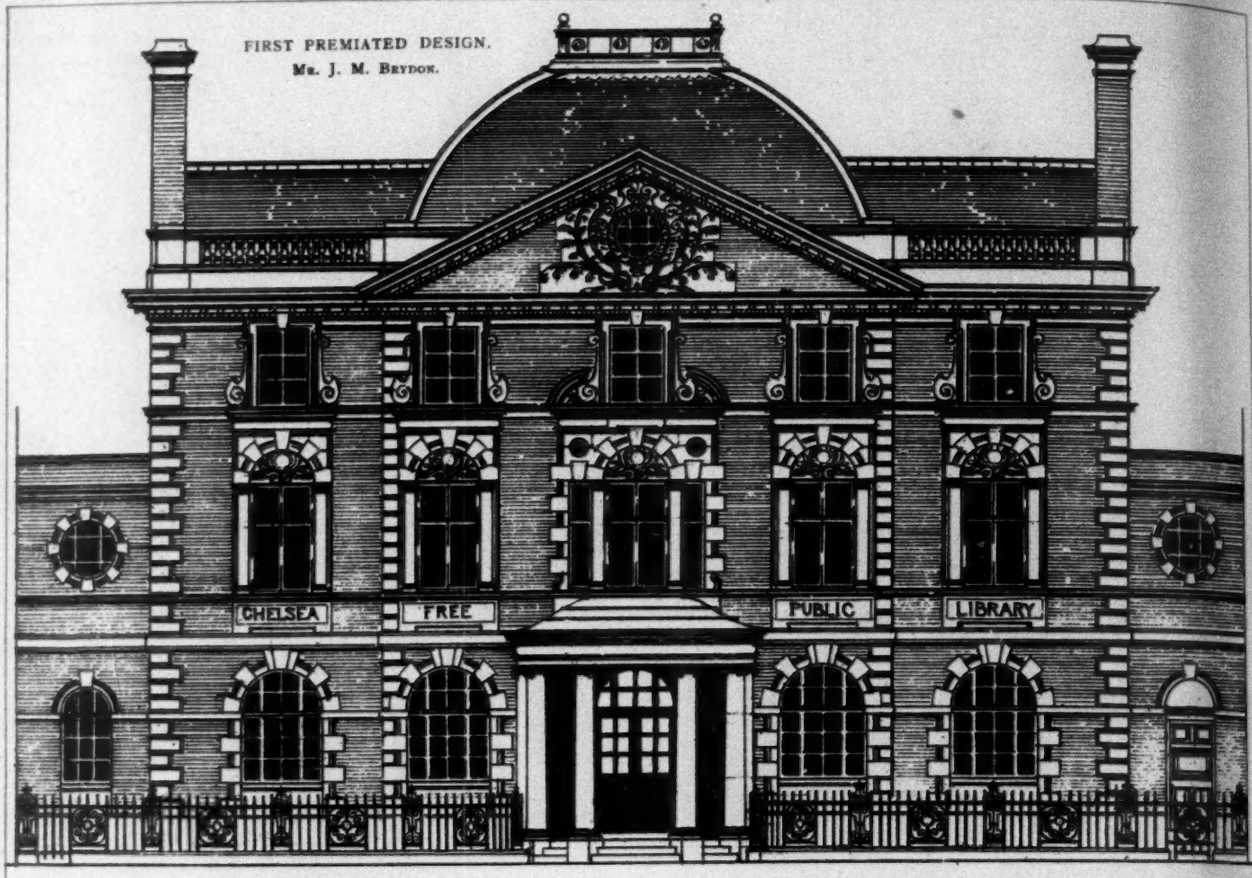



ST. JOHN'S CHURCH, BARMOUTH, N. WALES.—



ES.—Messrs. Douglas & Fordham, Architects.

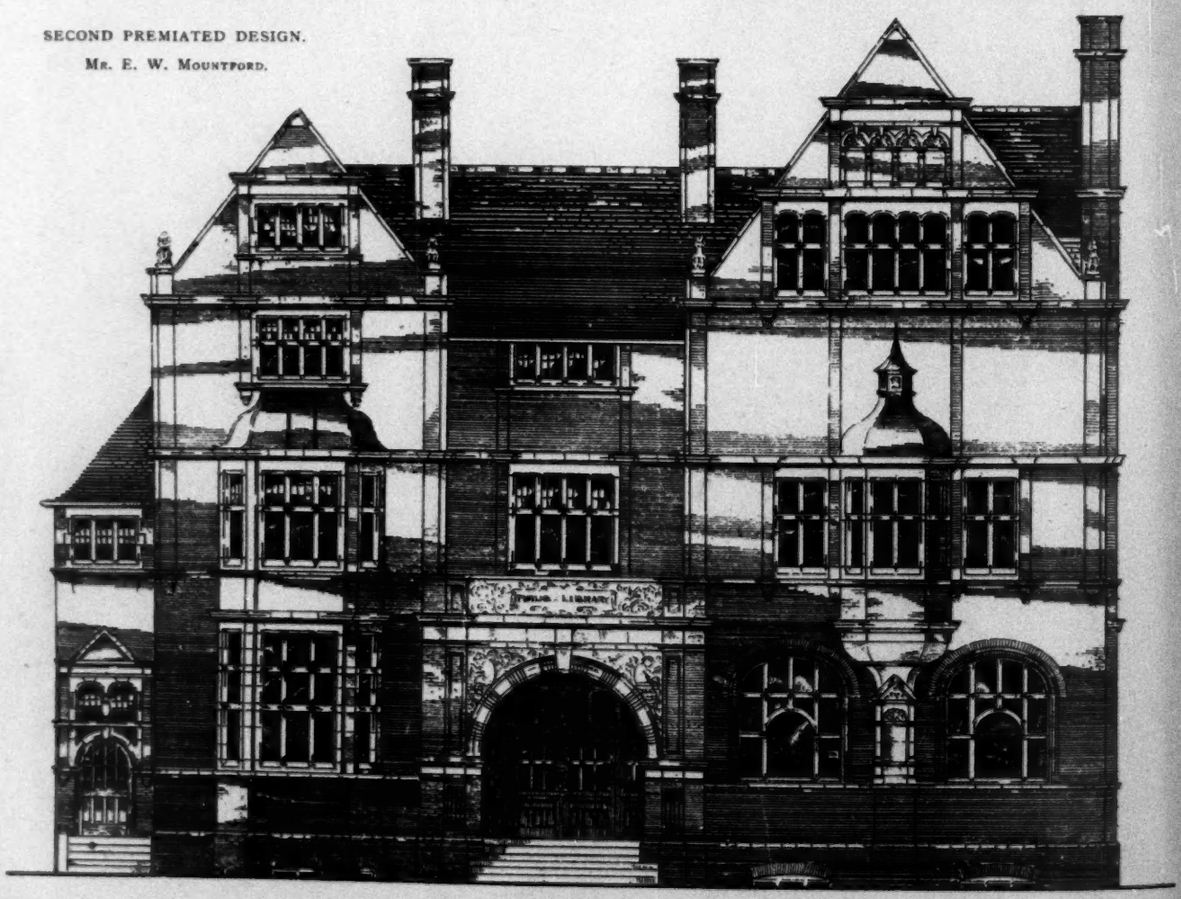
FIRST PREMIATED DESIGN.
Mr. J. M. Brydon.




## Front Elevation to Manresa Road:

10 5 0 10 20 30 40 50 feet.

SECOND PREMIATED DESIGN.
Mr. E. W. Mountford.



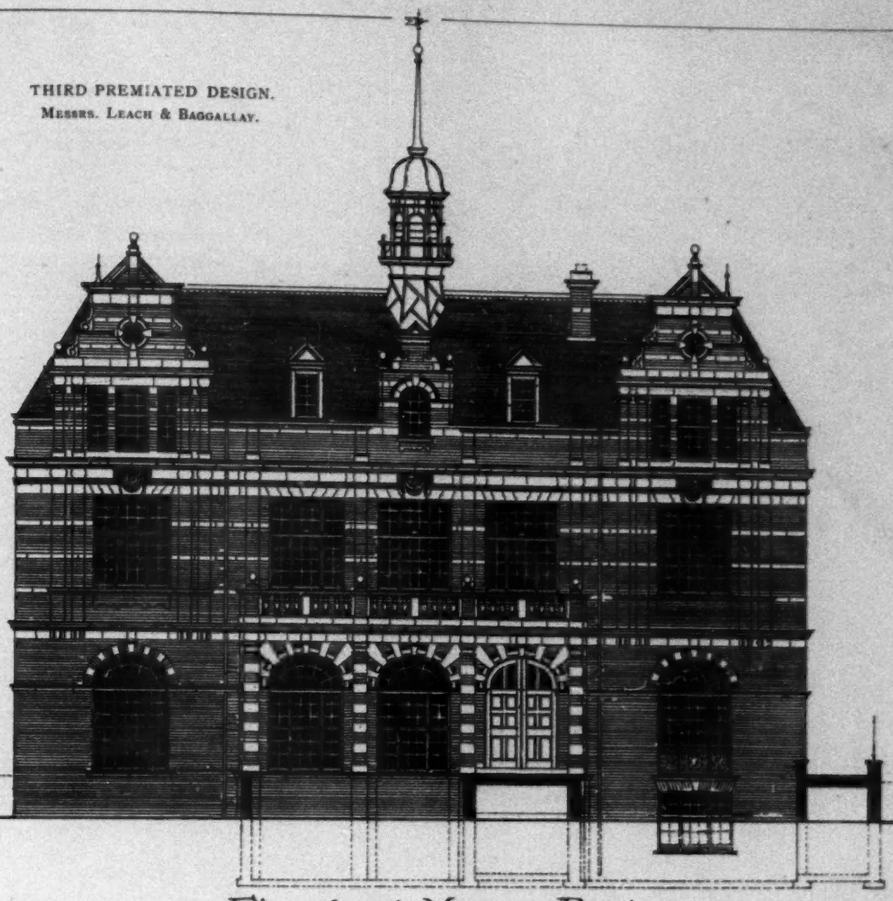
## Elevation to Manresa Road

Scale of 10 5 0 10 20 30 40 feet

PHOTO-LITHO. SPRAGUE & Co 52, MARTINS LANE, CANNON ST. LONDON, E.C.

CHELSEA FREE PUBLIC LIBRARY COMPETITION.

THIRD PREMIATED DESIGN.
MESSRS. LEACH & BAGGALLAY.



Elevation to Manresa Road.

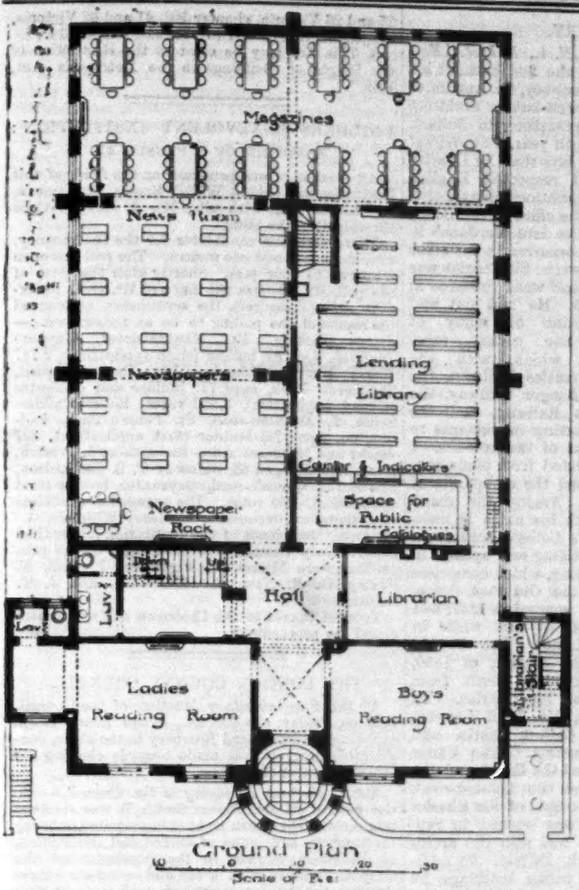
0 5 0 10 30 50 feet

ALTERNATIVE DESIGN.
MESSRS. LEACH & BAGGALLAY.

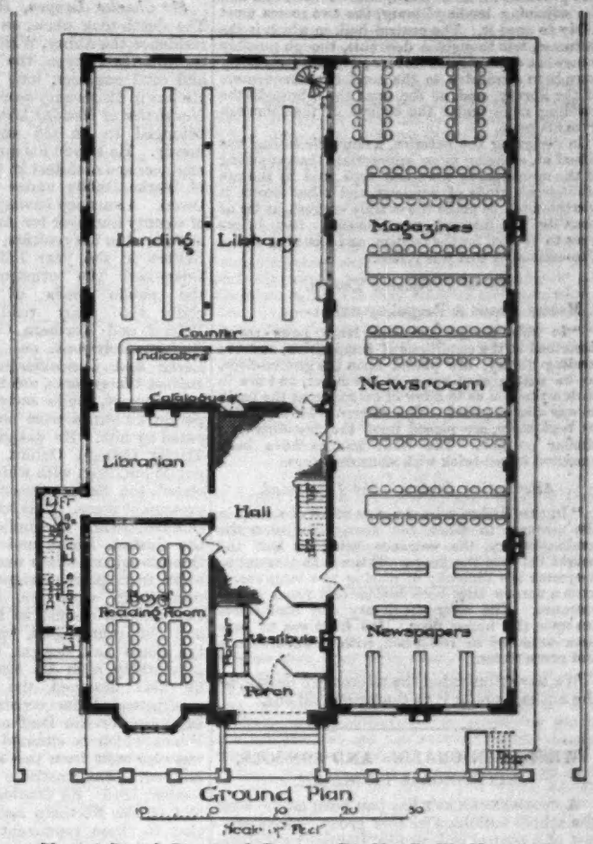
Elevation to Manresa Road.

PHOTO-LITHO. SPRAGUE & CO. 23, MARTINS LANE, CANNON ST., LONDON, E.C.

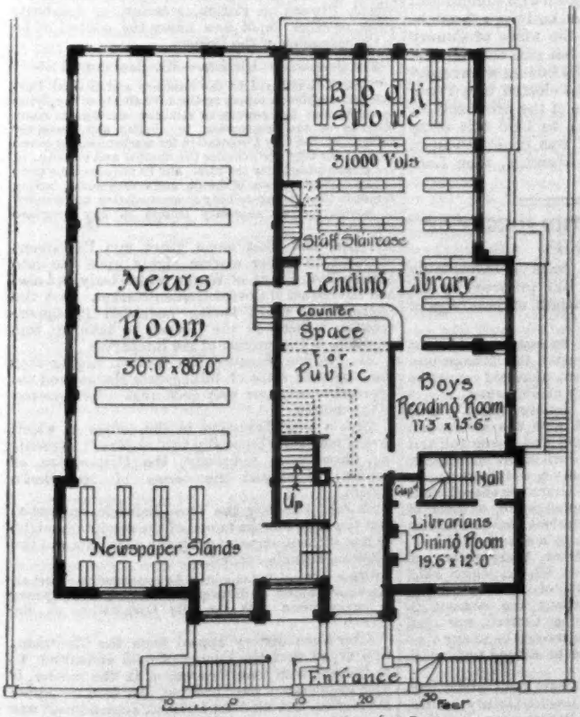
CHELSEA FREE PUBLIC LIBRARY COMPETITION.



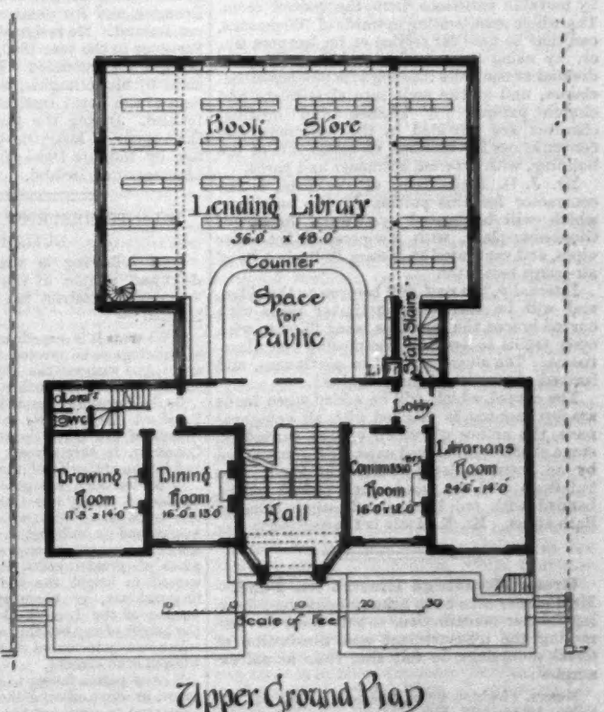

*Plan of First Premiated Design.—By Mr. J. M. Brydon.*




*Plan of Second Premiated Design.—By Mr. E. W. Mountford.*




*Plan of Third Premiated Design.—By Messrs. Leach & Baggallay.*




*Plan of Alternative Design.—By Messrs. Leach & Baggallay.*

CHELSEA FREE LIBRARY COMPETITION.—PLANS.

would, for the present, be left in plain colour on the plaster.

The warming will be by hot water throughout, but fire-places have been introduced in some of the rooms, where considered desirable, and in the residences. Fresh air will be admitted by Tobin's tubes in the side walls, more especially in the news-room, which is liable to become overcrowded. The cove under the ceiling of the news-room will be utilised as an extract-shaft for vitiated air, with openings into it, as shown on the sections, communicating with the Boyle's air-pump ventilators on the roofs of the book-stores above. The lending library will be ventilated in a similar manner, and the ladies' and boys' rooms provided with extract-flues carried up in the chimney-shafts.

*Second Premiated Design.*

Mr. E. W. Mountford, the author of this design, writes:—

"From the instructions it was obvious that the first thing to be considered was the reading-room, which therefore occupies the whole of one side of the site, with large windows in three sides and two

wide doorways on the fourth. Enlargement was also provided for as directed, both in this room and the adjoining lending-library, the two rooms most likely to need it. The central hall, in which is the staircase, was thought a desirable, though possibly somewhat extravagant, feature; it would certainly have been conducive to the comfort of frequenters of the library, and, at the same time, brought the building more under the control of the Librarian from his room.

In designing the exterior, a domestic feeling was aimed at, as being more appropriate than anything of the municipal or town-hall type, and by the use of different kinds of windows and other means, it was intended to make the outside suggest, as far as possible, the internal arrangement. Red bricks were to be used for the facings, and Doulting stone. The estimated cost was 7,100*l.*

*Third Premiated Design.*

Messrs. Leach & Baggallay write:—

"In this design the one large news-room, described in the conditions of competition, and the lending-library, are placed upon the ground-floor, to be within easy reach of the street, and are in such a position as to allow of extension at the back, as was also required. The reference-library, with its book-store, are placed upon the first-floor in a similar position. The front was to have been executed in red-brick with stone dressings.

*Alternative Design.—Not Premiated.*

"In this design advantage is taken of a drop in the ground to place the news-room below the lending-library, the entrance being at half the height between the floors. This was an attempt to overcome the difficulty of placing two large rooms upon a narrow site, both within easy reach of the entrance. The reference-library and book-stores are upon the upper floor. The front was to have been executed in red brick, with stone dressings and green slates."

We have illustrated the alternative design, as the authors prefer it to the premiated one.

## WESLEYAN CHAPEL AND SCHOOLS, KITTO-ROAD, PECKHAM.

A COMMENCEMENT has just been made with the school buildings in this group, which consist of a central schoolroom, lighted by a clear-story and surrounded by class-rooms, separable by movable partitions from the central room. The whole area, seating upwards of 700 persons, can thus be used for service or for lectures, &c., or, by using the movable partitions, may be divided at the sides into bays for Sunday-school classes, and at the ends into class-rooms and church parlour. A kitchen and heating-chamber are provided in the basement, and conveniences for children on either side of the building, with external entrances and yards.

Mr. J. O. Richardson, of Peckham, is the contractor for this portion of the buildings, which will be heated by Messrs. Jones, of Gloucester-place, with low-pressure hot-water pipes, and ventilated by Messrs. R. Boyle & Sons' air-pump ventilator.

Internally, the roof will be open to the ridge, and will be carried upon timber posts with curved braces, the spandrils being filled in with open trellis to assist in ventilating the class-rooms. The clearstory will be continuous, and formed of a series of cusped lights.

The chapel, which will be added when funds are forthcoming, is planned with an octagonal nave, the arches of which will be carried on stone shafts with carved caps, and surmounted by an internal dome vaulted in wood. The buildings will be faced with picked stocks, banded with red brick, the dressings being of Bath stone. Mr. E. Hoole is the architect.

**Greek Mouldings Illustration Fund.**—Mr. Penrose asks us to acknowledge the following further contributions to this fund for promoting the measurement and illustration of Greek mouldings, to full size, from actual examples:—

| | | | |
|---|---|---|---|
| Messrs. Flockton & Co., Sheffield..... | £2 | 2 | 0 |
| Mr. Arthur Hill, F.R.I.B.A..... | 1 | 0 | 0 |

**Works of Improvement in the River Elbe.**—In consequence of the shallowness and irregular course of the lower part of the River Elbe, the City of Hamburg has decided upon altering the course of the river in one or two localities, and deepening the river basin. The cost of these engineering works is estimated at nearly 2,000,000*l.*, and will occupy several years. The expenditure will have to be borne by the City of Hamburg alone, as that town will solely benefit by the same.

## OBITUARY.

*Sir Charles Lanyon, R.H.A., M.Inst.C.E.*—The death took place, on the 2nd inst., at his residence, the Abbey, Whiteabbey, Co. Antrim, of Sir Charles Lanyon, the well-known architect and civil engineer, long practising in Belfast. He was in his seventy-seventh year. The *Belfast Newsletter* of Monday last says that Sir Charles belonged to an old and respected English family. He served his apprenticeship as a civil engineer and architect in the office of the Board of Works, Dublin, under the late Mr. Jacob B. Owen. A vacancy having occurred in the office of County Surveyor for Antrim, Sir Charles was appointed to the position, and went to reside in Belfast in the year 1835. He laid out and supervised the construction of many of the public roads of the county, especially the coast road, which, with the Belfast and Northern Counties Railway, the Belfast, Holywood, and Bangor Railway, the Larne and Carrickfergus Railway, and the Belfast Waterworks, are lasting monuments to his memory, while several of the best-known public buildings were erected from plans prepared by him. He designed the campanile of Trinity College, Dublin. Among the many public buildings with which his name is associated, the Belfast Queen's College occupies a prominent place. This building was opened in October, 1849. The building, which comprises the Custom House and the Old Post Office, Queen's-square, which was opened in 1857, was built from plans designed by him while in partnership with Mr. Lynn. The County Court-house, opened in the summer of 1850, and the county gaol, were both built from the plans and designs of Sir Charles. In partnership with his son, Mr. John Lanyon, he also designed the Belfast Castle, and superintended its construction. The Ulster Institute for the Deaf and the Dumb and the Blind, which is situated on the Lisburn-road, was also built from the designs of Sir Charles Lanyon. The Institute was opened in September, 1845. Sir Charles was also the architect of the Northern Bank, Belfast. In addition to these prominent public buildings, he prepared the plans for several of the churches in the united dioceses of Down and Connor and Dromore, and for numerous buildings throughout Ireland. He resigned the office of County Surveyor in the year 1860, but still continued to practise his profession. His talents were recognised by his colleagues, who elected him President of the Royal Institute of the Architects of Ireland. During the time he held this office the honour of knighthood was conferred upon him by the late Duke of Abercorn, then Lord Lieutenant of Ireland.

## BILL TO RESTRICT THE HEIGHT OF BUILDINGS.

THE following is the text, commendably short and simple, of the Bill proposed by Mr. Whitmore to restrict the height of buildings in London:—

"Whereas it is expedient to restrict the height of buildings to be erected within the Metropolitan area: And whereas the object aforesaid cannot be effected without the authority of Parliament:

Be it therefore enacted by the Queen's most Excellent Majesty, by and with the advice and consent of the Lords Spiritual and Temporal, and Commons, in this present Parliament assembled, and by the authority of the same, as follows:—

1. No building, except a church or chapel, shall be erected in any street, thoroughfare, or place of less width than 60 ft., which shall exceed 60 ft. in height, and no building, except a church or chapel, shall be erected in any street, thoroughfare, or place of greater width than 60 ft., which shall exceed in height the width of the said street, thoroughfare, or place without the consent in writing of the London County Council, nor shall the height of any building so erected be at any time subsequently increased so as to exceed such width without such consent.

2. Any person failing to inform the District Surveyor, or other officer of the London County Council, appointed to carry out the Metropolitan Buildings Acts, of his intention to erect any building exceeding in height 60 ft., shall be liable to the penalties contained in the Act 25 and 26 Victoria, chapter 102, section 85, to be recovered by summary proceeding.

3. It shall be the duty of the District Surveyor, or such other officer of the London County Council, to inform the Secretary of State of any building intended to be erected contravening the provisions of this Act.

4. This Act shall extend and apply to the Metropolis as defined by the Metropolis Management Act, 1855.

5. This Act shall be read and construed with the 25 and 26 Victoria, chapter 102, 41 and 42 Victoria, chapter 32, and 45 and 46 Victoria, chapter 14.

6. This Act may be cited as the Restriction of the Height of Buildings in the Metropolis Act, 1889."

## BUILDERS' BENEVOLENT INSTITUTION:

### ELECTION OF A PENSIONER.

AN election of one pensioner on the funds of this Institution was held at Willis's Rooms, St. James's, on Thursday, the 30th ult., Mr. J. Howard Colls (President) in the chair.

There were four candidates for the one vacancy, viz., three men and one woman. The poll was open from two to four p.m. Shortly after the close of the poll, Mr. Thomas Stirling and Mr. Geo. Plucknett, J.P. (Treasurer), the scrutineers, announced the results of the polling to be as follows, viz.:—James Picking, 19, Mantua-street, Clapham Junction, aged 62, builder (sixth application), 2,747 votes; Henry Whimple, 12, Devonport-road, Shepherds' Bush, aged 71, builder and decorator (second application), 3,916 votes; Robert Childerhouse, 5, Ashmore-road, St. Peter's Park, Paddington, aged 74, builder (first application), 397 votes; and Margaret Alice Richardson, 5, Preston, North Shields, aged 65, widow of T. B. Richardson, late of 113, Queen's-road, Bayswater, builder (first application), 260 votes. The successful candidate was, therefore, declared to be Henry Whimple.

Among the friends of the Institution (other than those already named) who took part in the proceedings were Messrs. W. Scrivener, T. Hall, F. Foxley, G. B. New, R. Richardson, and J. T. Bolding.

Votes of thanks to the Chairman and scrutineers closed the proceedings.

## THE LONDON COUNTY COUNCIL.

AT the Supplementary Meeting of the Council, held on Friday, the 31st ult., in the Board Room at Spring-gardens, Lord Rosebery in the chair, considerable progress was made towards clearing the congested paper of business.

*Steam Engines Belonging to the Council.*—On the motion of Mr. Æneas Smith, it was resolved that a complete return be at once prepared showing the number, age, name of maker and description, of all steam engines in the possession of the Council, together with a full and complete return showing the total amount of coal used at each pumping-station, sewage works, asylum, institution, school, fire-engine station, steamer, or tug-boat, office, or other depôt now under the control of or in the possession of the Council.

*The Question of Markets.*—Mr. Beal moved:—

"That it be referred to the Sanitary and Special Purposes Committee to report on the advisability of applying to Parliament for powers to establish markets in many districts of the metropolis, to abolish any monopoly claimed by the City Corporation for markets within seven miles of the City; to consider the number and situation of the areas advisable for the same, and to propose some more or less uniform system of design and arrangement, having regard to the existing railway accommodation and density of population, as necessary factors in any complete scheme."

Mr. Beal said that some years ago Parliament proposed to confer market rights upon the late Metropolitan Board of Works, which body had also had the refusal of Covent Garden Market. But the Metropolitan Board having neglected its opportunities, it behoved the Council to take up this question, in the interest of the ratepayers.

Mr. Phillips seconded the motion, urging that the congested state of Billingsgate Market and its approaches was one very good reason for agreeing to the motion.

After a long discussion, in the course of which several members (especially two or three representing, directly or indirectly, the Corporation of London) deprecated the terms of Mr. Beal's motion.

Sir John Lubbock, the Vice-Chairman, suggested that the object of the mover of the resolution might be met without opposition by the acceptance of the following amendment, viz.,

"That a Special Committee be appointed to report on the whole subject of Metropolitan Markets, with power to communicate with the City Corporation on the subject."

After a conciliatory appeal from the Chairman, who urged that the Council should endeavour to co-operate with the Corporation in the matter, if such co-operation were possible, Mr. Beal withdrew his motion, and Sir John Lubbock's amendment was agreed to *nem. con.*

*The Sunday Opening of Museums.*—On the motion of Mr. Branch, it was resolved, by sixty votes for to nine against,* "to petition Parliament in favour of the opening of the metropolitan public museums, art-galleries, and libraries during such hours as may be convenient on Sunday and the evenings of week-days." In the course of the discussion on this subject, Sir John Lubbock stated that the Trustees of the British Museum had passed a resolution in

* The sixty-nine members taking part in the division constitute just a bare majority of the Council, which at its full strength numbers 137 members.

favour of the Sunday opening of the Museum, but the Government would not grant them the funds to meet the increased expenditure.

*The Livery Companies' Property.*—At the ordinary weekly meeting of the Council, held on Tuesday afternoon last in the Council Chamber at Guildhall, the *agenda*-paper was completely cleared, and the whole of the Reports were dealt with,—except the Report of the Corporate Property, Charities, and Endowments Committee. This Committee, of which Lord Hobhouse is Chairman, recommend the Council to pass the following resolution:—

"That Her Majesty's Government be requested to introduce into Parliament without delay a measure for the purpose of carrying into effect the reforms contemplated by the majority of the Royal Commissioners appointed in the year 1880, with reference to the Livery Companies of London, including a Bill on the principle of that which was introduced by Sir Charles Dilke and the Attorney-General in 1885."

As this Report involves a great deal of contentious matter, it was decided to devote a special sitting of the Council to its discussion,—probably on the first Friday after the Whitsuntide recess.

*Contracts and the London Building Trades' Committee.*—The first paragraph of the Standing Committee's Report was as follows:—"The Council at its last meeting adopted a suggestion of the Chairman that a Special Committee should be formed to receive a deputation from the London Building Trades' Committee, and to inquire into the subject of fair contracts which that Committee wished to bring before the Council. The suggestion was that the Special Committee should consist of the Chairmen of such of the Committees as had to deal with contracts, and of a few other members to be selected by the Standing Committee. Your Committee recommend—

"That the Special Committee do consist of Lord Lingen, Mr. Martineau, Mr. Osborn, Mr. Hutton, Mr. Haggis, Mr. Rhodes, Lt.-Col. Howard Vincent, Mr. Henry Clarke, Lord Monkswell, the Earl of Meath, Mr. Burns, Sir T. Farrer, Mr. C. Harrison, Mr. Smith, and Mr. Hunter."

Mr. G. B. Holmes moved as an amendment (seconded by Mr. Sly) the addition of the words "and of the Members of the Council who are or who have been engaged in the building trade,"—in other words, Councillors Holmes, Marsland, Roberts, and Stevens. Mr. Holmes expressed his astonishment that this special committee, who would have to consider a special subject, should be proposed to be constituted without the assistance of the very members who were experts in that subject. The amendment was unanimously agreed to.

*Electric Lighting for the Metropolis.*—The Highways Committee brought up a report stating that they had considered Major Marindin's recent report on this subject, and submitting the draft of a letter which they proposed to send to the Board of Trade on the subject. This letter, which has been published *in extenso* in some of the newspapers, expresses agreement, in the main, with Major Marindin's conclusions, and was adopted by the Council and ordered to be sent to the Board of Trade.

*The Administration of the Metropolitan Building Act.*—One of the paragraphs of the Report of the Building Act Committee was as follows:—

"Your Committee have to report that they have had before them an application of Messrs. Ford & Hesketh, on behalf of the London Restaurant Company, Limited, for the consent of the Council to the construction of a building with excess of openings at No. 111, Cheapside. The Building Act does not give the Council power to dispense with the requirements of the 13th section of the Act relating to recesses and openings in walls, but your Committee are informed that it was the practice of the late Board to approve of applications of this nature, in certain cases where the mode of construction was satisfactory. Your Committee think it desirable that the Council should adhere strictly to the provisions of the 13th section as regards excess of openings, and they wish to place on record an emphatic expression of their opinion to that effect. In the present instance the application is contrary to the terms of the Act, and your Committee recommend that it be not granted."

This recommendation led to some little discussion, in the course of which Mr. Hollington, Mr. Clarke, and other members of the Council spoke of the inconvenience which would arise if the Committee's recommendation were agreed to; but the Chairman said that the Council had no option in the matter, and the recommendation of the Committee was thereupon agreed to.

*London Fogs.*—Mr. Walter Wren having moved the resolution standing in his name on the subject of London fogs and their mitigation (mentioned in our last), the subject was referred to the Sanitary and Special Purposes Committee, and the Council adjourned until the 18th inst.

**Competition: Wesleyan Chapel, Middleton.**—The Wesleyan Methodists of Middleton Junction having decided to erect a new chapel, invited the local architects to send in competitive designs. Seven sets of plans were submitted in response to the invitation, and the Committee, after mature consideration, decided to accept the plans under motto "Wesley," which were found to have been submitted by Mr. A. Banks, architect, Oldham.

## "GEOMETRICAL PROPORTIONS."

SIR,—I cannot venture to maintain against Mr. Wm. White's authority any opinion that depends solely upon the results of Mediæval research, and it is, therefore, with deference to superior knowledge that I suggest reasons for doubting that the artistic proportions of ancient cathedrals result from the employment of a system of Applied Geometry.

The point is of importance to architectural students, as the suggestion of a definite rule for obtaining artistic proportions has something of the charm and evil about it that rendered the search for the philosopher's stone such a hindrance to true industry and research in the Middle Ages.

There is a definite absence of direct evidence of the employment of geometry for artistic, as distinct from constructive, purposes by Mediæval architects, an absence so conspicuous that it amounts, in the case of Wilars de Honecort's drawing-book, to a presumptive proof of their ignorance of the theory or practice. The date of this architect's drawing-book is covered by the period A.D. 1227-51. He was the friend of known contemporary architects, and gives us most vivid glimpses of their artistic world. This album is prefaced with the description of its contents as follows:—"In this book may be found good help to the knowledge of the great powers of masonry, and of devices in carpentry. It also shows the power of the art of delineation, the outlines being regulated and taught in accordance with geometry." He is, therefore, acquainted with geometry of a very primitive character, but he shows us how to draw wrestlers and ostriches with arcs, tangents, and triangles, as well as horses, faces, and sheep. He measures the width of impassable streams, and the height of towers, sets out voussoirs and molds, plans pentagons, draws three arches with one opening of compasses, and performs sundry other feats all "in accordance with geometry." He also draws, without geometry, a clock tower in peculiar Mediæval elevation-perspective; he draws a correct plan of one of the towers of Laon Cathedral, with another elevation, also a window of Rheims Cathedral describing its relation to the "severies of the nave," and later in the book gives fairly faithful elevations of the inside and outside of one of the apsidal chapels of the same cathedral. The plan is also given of a square-ended church for the Cistercian Order, and a plan of the apse of the now destroyed Cathedral of Cambrai "as it is now rising from the ground," of which he is supposed to be the architect.

A very interesting plan of a church is given "which Wilars de Honecort and Peter de Corbie contrived together"; also a plan of the Church of St. Stephen, at Meaux. He draws "a window of the Church of St. Mary, at Laon" with tolerable accuracy, and one from Lausanne which he alters considerably; also the presbytery of the Church of St. Mary, at Vaucelles, and finally two gabled and one pent roof.

It is most remarkable, if Mediæval architects, as Mr. William White, among others, maintains, used geometrical proportions in designing, that this thirteenth-century architect in his extensive range of sketches and notes does not refer to the existence of any rule for the ordering of proportions by geometry, though he applies it mercilessly and inconsistently to forms and subjects to which it is most unsuitable. The proof is almost positive that this cathedral architect who saw Beauvais begun in 1247, sketches Rheims in course of erection, besides seeing Amiens, was in blissful ignorance of the secret of their beauty, though he sketches them, and, with Peter de Corbie, devises an original chevet in advance of any of their plans. In one sketch only does he apply geometry to an architectural design; a pentagram,—the star-shaped symbol of Freemasons,—is worked into the lines of the gables of a tabernacle, and, on the same page, into a man's face and spread eagle.

I have endeavoured to deal with Wilars in some detail, as he is a contemporary witness, and proves, by his silence, the negative Mr. White asks for. That ingenuity can evolve a system of pseudo-mathematical proportions for each individual cathedral I will not deny, for the presence of the given factors of width and thrust of vault naturally and scientifically provide us with buildings which invite the application of geometrical theories of proportion. But they are futile in procuring beauty, harmony, and natural variety or rhythm of proportion. The few examples by modern architects of designs upon this system can be adduced as sad instances of its failure.

The architectural student should be earnestly entreated to study the planning of cathedral vaults and their thrusts, if he would ascertain the true rules that have ensured architectural success, rather than an unscientific theory that has to assume more than it proves, and is incapable of application to the practical necessities of design.

A. BERESFORD PITE.

*5, Bloomsbury-square, W.C.,*
*June 5, 1889.*

SIR,—I feel much more at home in the laws of geometry than in the laws of logic, and I should be very glad of a little information upon the logic of a foot-note to my communication in your last number, for I must freely confess I was not at all aware that calling on any one to disprove a positive statement was absolutely the same thing as calling upon him to prove a negative.

Mr. Pite had already essayed to prove a negative, without being called upon to do so, when he "tested the theory" and could find nothing, in it, beyond a "*reductio ad absurdum*."

WILLIAM WHITE, F.S.A.

*** We are happy to print Mr. White's comment, but we believe we are quite correct in saying that it is a dis-allowed position in logic to say to an opponent "I defy you to disprove" so-and-so. The person making the assertion is bound to give satisfactory proof of it; the opponent's position is that the proof is unsatisfactory; *i.e.* does not cover the whole ground. Mr. Pite's remark that he "had once thought there was something in the theory, but having tested it had come to a different conclusion," exactly amounts to that, and is a perfectly correct logical position. A *reductio ad absurdum* is not the same thing as proving a negative. It is, properly speaking, an argument which shows that the contrary of the proposition maintained is necessarily absurd. The expression is often used inaccurately.

Those who maintain the theory under discussion are, as far as our experience goes, very prone to demand that we should accept large conclusions on insufficient data. Their fallacy, in logical form, is—

Every A is B:
Some C's are A:
Therefore every C is B.

It hardly requires a primer of logic to show that that is a defective syllogism. Mr. White says, in effect, "I defy you to disprove that some C's are A." It is his business to prove it; but if proved, it does not cover the ground claimed.

## TENDERS.

SIR,—In response to an advertisement appearing in your issue a fortnight since, our representative journeyed to Maidstone and submitted an estimate for work as asked for. We received a reply stating that our tender was not accepted, and on our applying for usual list of tenders, specifying which was accepted, we get the enclosed reply. As we think this sort of treatment is unfair to those estimating, which is not done without expense and trouble, we should be glad if you would kindly draw attention to this method of obtaining tenders when probably it is only done to check some local tradesmen at the expense of others.

JOHN SMEATON, SON, & CO.

[Copy of Reply received.]
"Kent County Asylum,
Barming Heath, Maidstone.

The Committee of Visitors of this Asylum object to give the information asked for.

(Signed) F. PRITCHARD DAVIES, Superintendent.
June 5, 1889."

*** To refuse to give a list of tenders is not only unfair and discourteous to the firms tendering, but impolitic as regards the building owners. It suggests a suspicion of unfair dealing, even if there may be none in reality.—ED.

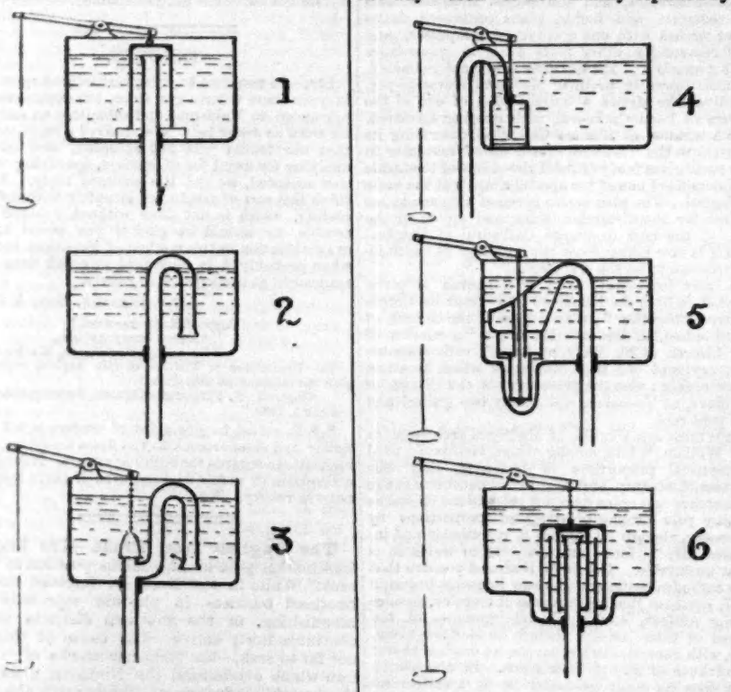
**The English Iron Trade.**—The English iron market is in an anomalous position at present. While in the North of England and in Scotland business in pig-iron especially is languishing, in the Southern districts trade continues fairly active. The cause of this is not far to seek,—the immense stocks of crude iron which overburden the Northern markets, the baneful influence of which upon the development of trade has been drawn attention to time after time, crippling an otherwise healthy industry. In the Glasgow warrant market the downward tendency referred to in our last report has continued during the present week, affecting at the same time the stability of makers' iron, the quotations of which have been reduced from 6d. to 1s. 6d. a ton. Cleveland iron has lost another shilling on the week. Prices of pig-iron are well maintained in the Southern crude iron centres, while Bessemer iron in the North-west,—thanks to a well-sustained and large demand,—has not only recovered the decline which we had to record last week, but has gone up 1s. a ton, making the price 49s. 6d. The manufactured iron trade is in about the same position from a local point of view. That of the North is quieter, and the markets are weaker, while in Lancashire and Staffordshire a strong tone prevails, with a tendency in rates to go up. Welsh bars have regained the loss of last week; and the tinplate trade is improving. The steel trade continues active on the whole, and values are fairly well kept up. In the North-west, however, they show a rising tendency, rails and blooms having advanced 2s. 6d. a ton, and wire rods 10s. There is no change in shipbuilding, but the riveters' strike in the Clyde yards is seriously affecting the trade in Scotland. Engineers continue prosperous.—*Iron.*

## The Student's Column.

### TOWN DRAINAGE.

#### XXIII.—SIPHON CISTERNS.

PNEUMATIC action has been brought to bear upon the discharge of water from waste-preventing cisterns in several different ways. There are two chief forms,—the vacuum and the plenum processes. With regard to the vacuum process, no real vacuum is possible or attempted to be produced, and the term relates only to a slight reduction of the atmospheric pressure within a pipe while full pressure exists outside the pipe. It brings into play the normal pressure of the atmosphere on the greater portion of the surface of water in a cistern, while from a portion of that surface the pressure is temporarily reduced. If a pipe be set up in a cistern, the bottom of the pipe being closely attached to the bottom of the cistern and the top of the pipe open, and if the cistern be supplied with water until it rises to the top of the pipe, the water will flow into its mouth at the same rate as that with which it comes into the cistern,—say, two or three gallons in a minute if situated high above-ground, or three or four gallons if near the ground level, the time in either case varying with the size of the supply-pipe and pressure of water in the street main, but in no case being more than a small stream of water.




But let this upright pipe be surrounded by a larger one, with a considerable space between the two, and let the bottom of the outer pipe or cylinder be open and its top closed, and let it rest upon three or four studs at the bottom of the cistern, equidistant round the foot of the inner pipe, and 2 in. or 3 in. high. There will then be a waterway under the edge of the outer pipe and up through the space between the two pipes (fig. 1). Under these conditions the pressure of the atmosphere upon the top of the outer pipe, cylinder, or cap, will be that of the atmosphere,—say 14·7 lbs. per square inch, which is the weight of the atmosphere when heavy enough to support a column of mercury 30 in. high. As long as this outer cylinder or cap rests upon its supports at the bottom of the cistern there is the same pressure upwards against the underside of its close top, so that if it were lifted up its own weight would be the only weight to be raised, except that the act of lifting it immediately alters the relative pressures. While at rest, the water in the annular space between the two pipes stands level with the open top of the inner one, the space above this level, between it and the underside of the outer pipe or cap, containing air of the same density as that outside. If the bottom end of the inner pipe be closed, either by a valve opening outwards or by dipping into water so that no air can ascend through the pipe, and if the outer pipe or cap be now raised, the density of the air in the space between the top of the inner pipe and the underside of the outer one will be reduced by being made to occupy a larger space, and its pressure per square inch will be reduced in a corresponding degree, being 1 for a space of 1, ½ for a space of 2, ¼ for a space of 3, and so on in other degrees.

The pressure per square inch of the air at the top of the inner pipe and on the surface of the water in the annular space between the two pipes being thus reduced below that upon the surface of the water in the cistern, the difference thus created causes a flow of water to take place upwards through the annular space, and down the pipe at a rate of flow much greater than that with which the cistern is supplied. The dimensions of the parts are made so as to give a rate of flow of about two gallons in five seconds, but there is no difficulty in increasing this rate of flow, even to a greater degree than would be desirable. The flow through the siphon thus brought into action would continue until the surface of the water in the cistern fell to the bottom of the outer pipe. It is necessary, therefore, to limit the size of the compartment in which the siphon is placed, so that no more than the stipulated quantity of water be discharged at once, the small compartment being re-filled through a short pipe communicating with the cistern, supplied through the ball-valve or ball-cock. The old two-way "cock" is now usually replaced by a valve, which does not leak so much with wear.

This form of siphon is the fundamental form of any siphon, but there are various improved ways of bringing it into action. What is aimed at in the vacuum process is to reduce the air-pressure in the descending pipe by forcing out a part of it by a charge of water, whereupon the reduced pressure of the remainder allows such a preponderance to the atmospheric pressure that the whole body of water in the compartment is forced out. If a bent tube be fixed in a cistern as in figure 2, its mouth reaching nearly to the bottom of the cistern, and the cistern be filled with water through the ball-valve until it reaches the bridge of the bent tube, forcing the air before it, the water then begins to fall into the descending pipe, and carries a part of the air with it by contact. This increases the rate of flow of the water, until, increasing faster and faster, it soon fills the throat of the pipe and carries all the remaining air with it, producing a still more rapid flow, so that the compartment is quickly emptied. But in this simple form the action does not begin soon enough for the convenience of water-closets and other house-fittings. Means are adopted therefore to bring it at once into action on the pulling of a chain or the lifting of a handle. In figure 3 is a vertical branch on the bent tube, its mouth being closed by a valve. The valve is connected by a chain to the lever over it, and is opened in the same way as is the similar valve of the double-valve cistern before mentioned. As soon as this valve is opened, the water descends the pipe and reduces the pressure of the air in it, and, although the valve be dropped again into its place almost immediately after opening it, the water continues to flow out of the compartment through the bent tube, which enters the descending pipe below the valve-seat. That or some similar means must necessarily be adopted in any form of the vacuum process in which the action is begun by the movement of the lever belonging to the water-closet apparatus; but there is another means of starting the siphon,—the plenum process,—by which a part of the water in the compartment is lifted bodily into the mouth of the descending pipe of the siphon, as in Braithwaite's form (fig. 4), or in Lee, Howl, & Co.'s (fig. 5).

The figure 6 shows the general form of Humpherson's siphon, as made by Messrs. G. Farmiloe & Sons, in which there is an inner and an outer cap over the descending pipe, each having at the bottom a flange projecting inwardly, and there is a standing partition between the two caps. The internal flanges lift a small quantity of water into the mouth of the pipe, which starts the siphon, the action of which continues with full force to the last. A similar form of siphon is made to work automatically for urinals by Mr. Milton Syer. These are but a few of the many forms of siphon cistern, but they may serve to show the principles on which most of them are constructed.

## Books.

"*Graphics;*" *or, the Art of Calculation by Drawing Lines.* Part I. By Professor ROBERT H. SMITH, of Mason College, Birmingham. 1889. Published by Longmans, Green, & Co., London and New York.

THIS ingenious book is accompanied by an atlas of diagrams, neatly drawn and separately bound. The plates are numbered, and reference to the figures is considerably aided by the diagrams being numbered consecutively, without regard to the number of each plate.

A comprehensive glossary of special terms and symbols is provided, which must be first learned before studying the book, and the application of these terms and symbols is explained upon page 86. The author seeks to apply new graphic methods to the solution of the various problems which are met with in mechanical engineering, but the question is, Will civil and mechanical engineers employ these new methods? The accomplished practitioner is prejudiced against all such new systems, which need constant practice to be remembered, and no conscientious employer would trust to results worked out by an assistant who uses a method to which the employer is not accustomed. The author himself properly states on p. 112 that "the student should in no case be content to employ graphic processes without clearly and accurately understanding the physical interpretation to be put upon them." We approve of graphic methods, but those shown by the author require more frequent use to be remembered than the ordinary draughtsman is called upon to employ. The book aims at avoiding formulæ, and yet in chap. X. provides a formula for determining the number of joints compared with a given number of bars or links.

The author's remark on p. 4 as to the degree of approximation which may be relied upon in calculation is very good; also his caution upon p. 21 as to possible errors in intersecting points when badly defined by the use of ill-conditioned triangles; yet he admits on p. 25 that, of necessity, ill-conditioned triangles must be sometimes used in complicated graphic constructions to avoid changing the scale of the diagram. On p. 19 he gives the preference to the use of a pair of dividers over a finely-divided scale for the purpose of transferring lengths from one line to another. His hints on p. 70 as to the avoidance of confusion and obscurity in a diagram by avoiding the drawing-in of unnecessary lines upon a drawing are worthy of attention. On p. 165, the author states "no forces act through mathematical points; they are all more or less distributed through certain volumes or masses, and act always through sectional areas of finite magnitude;" while, as remarked on p. 89, quoting from Professor

Clerk Maxwell, "any one who will try to imagine the state of a mind conscious of knowing the absolute position of a point, will ever after be content with our relative knowledge."

The occasions mentioned in the preface, when "the aid of the more complicated portions of algebraic and trigonometrical mathematics, or of the differential and integral calculus" have to be called in, do not frequently occur, and when they do occur, the symbols employed in this book would need looking up before the methods advocated by the author could be correctly applied. After perusing this book, we cannot say we have been informed of much that can be generally employed as an improved method for the investigation of the strength of structures. It is interesting to note that the theoretical development of graphic methods is chiefly due to Cremona, an Italian, as well as to Culmann, a German; also that it was Professor Clerk Maxwell who first investigated the reciprocity which exists in the geometrical relations between an outline of a structure and a force diagram. We quite agree with the author that the notation used by Mr. R. H. Bow, the earliest invention of which is ascribed to Professor Henrici, is undoubtedly the best system for marking stress-diagrams; but we fail to see the practical merit of showing how ordinary arithmetical addition, subtraction, multiplication, and division, may be effected by a graphic method as set forth in the earlier chapters of the book.

---

*Practical Surveying.* By G. W. USILL, Assoc.-Mem. Inst. C.E. London: Crosby Lockwood & Son.

THIS compact treatise is intended as a text-book for the use of students preparing for examinations or for survey work in the colonies. It contains many useful and original suggestions, and is accompanied by four lithographic plates and upwards of 330 illustrations. The names of certain makers appear on some of these illustrations, while, in the case of other instruments, no maker is named.

The index to the illustrations supplied at the commencement of the book is valuable to the student for reference when, in the future, he finds that he does not employ some of the special instruments very frequently. The table of contents and the index supplied are both useful. After six pages of introduction, the author deals with ordinary surveying, in which his remarks upon the approximation to lengths arrived at by the system of pacing are very very good. Respecting offsets, the author's general preference for an offset-staff cannot be followed in every instance. Tape measurements are in many places most useful for offsets. The author very properly expresses the opinion that accurate chaining may be accomplished by carefully stepping the chain over sloping ground, as the method of calculating the horizontal from the hypothenusal measurements by the tables given on p. 22 is not the plan generally adopted. It is mathematically true, and would prove the easiest method if ground could be found to slope regularly like the slant of a roof; but, as a rule, the ups and downs to be passed over are very irregular, and some high point may intervene upon the line of sight in determining the angle between a distant station and the horizontal. The chapter on surveying instruments is well illustrated and described, while the succeeding chapter, entitled "Trigonometry as applied to Surveying," is more theoretically written than as applied in practice to surveying. Chapter V., on "Chain Surveying," favours the use of a single line in the field-book for recording the chain measurements. We prefer the usual double line column, as shown in the author's Field Book illustrating "Theodolite Surveying," and do not agree with the opening remarks of the following chapter that "it seems hardly necessary to say that *all* important surveys are now executed with the theodolite or other instrument for obtaining the angles which a line or lines make with another." It is true that in an extensive survey the long lines can be best ranged with a theodolite, but in open country the base lines are most accurately connected by chain measurements, and the theodolite is used for taking the angles as little as possible. We agree with the author that the most reliable, as well as the most expeditious, system for setting out curves is by means of the theodolite (p. 212). In the author's illustration of the Level Book, the system termed "the right way" is not the best way. The better plan is to enter a back-sight when taken upon the same point as the previous fore-sight, in the same line, as shown in the system which the author terms "the wrong way" (p. 187), the description of these points in the column of remarks being the same. This is the method adopted by the author in his Level Book for contour levels (p. 209), and it is a pity he has not adopted the correct method in his previous chapter. The paragraph headed "As to Distances" is very good. The author very properly recommends the surveyor to make his assistants thoroughly understand their duties and his requirements (p. 198), adding that by a code of signals mutually understood, a great deal of satisfactory work may be accomplished in almost dumb-show; and he provides, at the conclusion of the book, a very practical chapter upon office work, and some useful hints upon the calculation of land quantities.

---

*Applied Mechanics.* By DAVID ALLAN LOW. Published by Blackie & Son. 1889.

THIS little book is well arranged, and is a most serviceable book for teachers. The principles appear to be correctly enunciated, the index is thoughtfully compiled, and the examples are well worthy of the term "Applied," which is given in the title of the book. The answers are given at the end, so that the student may test the results of working out his calculations. A good feature in the work is that the student is enabled to pass over the more difficult portions at a first perusal of the book, the more advanced paragraphs being marked with an asterisk for future study. The chapter upon the nature and use of materials in construction is very practical, but in the succeeding chapter, on the resistance to tension, compression and shearing, we should have liked to see more said about the properties and capabilities of mild steel, which is now so much employed in construction. The work concludes with a syllabus from the Directory of the Department of Science and Art. The price is only two shillings, and as an elementary text-book we can heartily commend its perusal to our readers.

---

## RECENT PATENTS.

### ABSTRACTS OF SPECIFICATIONS.

8,334, Fastenings and Hinges for Doors. J. T. Hopkinson.

The box or staple for door bolts or chains which is the subject of this invention is made with an angle-plate for attachment to the door-frame, so that there are two sets of fixing-screws at right angles to each other. This prevents the box or staple from being forced off. Butt-hinges are similarly formed of two angle-plates attached to the door and frame respectively.

8,338, Improved Weather-bar for Doors and Windows. H. J. Lansbury.

According to this invention, a bar or strip of wood is hinged to the door, or recessed into it. When at rest, the weather-bar projects below the bottom of the door, and is held in position by a spring. When the door is opened, the bar, which projects a little at the side, coming against the frame of the door, is forced to rise in its bearings. When the door is closed, the weather-bar falls to its normal position.

8,831, Crushing and Mixing Mortar. E. Chatham.

According to this invention, the lime and sand are put into a cradle or trough and rocked. In the centre of the cradle is mounted a roller, which works the lime and sand thoroughly together.

9,360, Ventilators. J. and W. Cormack.

The apparatus which is the subject of this patent is fitted at or on the outlet of the chimney, and at or near the top of ventilator are formed the side openings forming the outlet. A coned cylinder hangs suspended near the openings, and the wind, blowing against one side, causes the trumpet-shaped orifice in the cylinder to move and close the opposite opening, thus preventing back or down draught.

4,806, Elastic Tiles. Sir E. J. Harland, Bart.

The tiles which are the subject of this patent are made of vulcanised rubber, and are cemented to the floor. Being soft and elastic, they afford an excellent foothold, and are thus useful for decks, cabins, &c., at sea. The slightly-yielding nature of the material renders traffic over them noiseless, and enables such flooring to stand wear and tear in entrance-halls, landings, &c. Being impervious to water, they form a cleanly floor in smoking-rooms and smoking-carriages.

5,400, Safety Window-fastenings. W. J. Thomas and W. Strong.

The catch of the fastener which is the subject of this patent is so formed as to drop into a notch and form a double fastening, which is further secured by the action of a metal projection.

### NEW APPLICATIONS FOR PATENTS.

*May* 20.—8,331, W. & B. Clarke, Tiling, Slabbing, and Panelling Surfaces.—8,330, R. Taylor, Window-sash Fastener.—8,331, G. Butt, Screws and Nails.

*May* 21.—8,400, J. Porter, Electric Bells.—8,428, M. May, Artificial Stone.—8,435, W. Thompson, Fastening Window-sashes, Folding-doors, &c.—8,444, W. Macdonald, Sash-fastener.—8,466, D. Brown, Ventilators.

*May* 22.—8,482, J. & A. Duckett, Water-closets and Flushing-tanks therefor.—8,511. E. Busby, Bricks, Tiles, &c.—8,513, T. Hughes, Roofing, &c.—8,517, J. Churchill, Ventilating.—8,532, O. Elphick, Lavatories.

*May* 23.—8,546, T. Horner, Hinges.—8,563, C. Showell, Door, Sash, and other Handles.—8,572, C. Taylor, Plane-irons.—8,595, C. Ashworth, Emergency Exits for Theatres, &c.—8,615, H. Stanynought, Door-checks.

*May* 24.—8,620, R. Cousins, Girder.—8,623, J. Sykes and T. Cook, Securing Door-handles to Spindles.—8,625, J. Redpath, Cooking-ranges or Fireplaces.—8,642, T. Count, Sash Window-frames and Means of Opening and Closing the Sashes.—8,654, F. Davies, Fastenings for Doors, Windows, &c.

### PROVISIONAL SPECIFICATIONS ACCEPTED.

3,516, A. Ferrett, Windows and Window-fastenings.—5,644, T. Shouler, Turns or Fasteners for Cupboard-doors.—5,967, C. Gardiner, Fence for Planes.—6,054, R. Wilding, Ventilation of Water-closet Basins, &c.—6,101, T. Dault, Casement Windows and Doors.—6,166, H. Adeane, Fixing Sash-lines to Sashes.—6,261, F. Meriton, Chimney-pot.—6,389, Sir E. Harland and C. Gray, Elastic Tile-flooring, &c.—6,573, S. Wilmot, Metallic Roofs.—6,655, H. Heim, Fireplaces.—6,874, J. Tata and J. Lyon, Mosaics.—6,953, J. Martindale, Ventilating and Chimney Cowls.—7,525, S. and W. Dearden, Stone-cutting or Sawing Machinery.—7,593, A. Hogan, Preventing the Bursting of Water-pipes by Frost.

### COMPLETE SPECIFICATIONS ACCEPTED.

*Open to Opposition for Two Months.*

9,273, C. Bennett, Laying and Fastening Wooden Flooring.—9,343, F. Hodges, Mitreing Bench and Vice.—9,968, W. Lindsay, Bridges, &c.—11,249, W. Ross, jun., Siphon Drain-pipes.—14,402, E. Edwards, Window-sash Fasteners.—1,282, J. Hannay, Whitelead, &c.—2,531, G. Newman, Spring Hinges and Door-closers.—2,702, E. de Mejer and T. Greenwood, Paper Stucco.—2,844, A. Ponton and others, Artificial Stone.—6,393, P. Simon, Plate-glass.

---

## RECENT SALES OF PROPERTY:

### ESTATE EXCHANGE REPORT.

MAY 21.—By Messrs. COBB (at Rochester).

| | |
|---|---|
| Rainham, Kent—F. residence, with grounds, r. £45 p.a. | £750 |
| Three f. cottages and a plot of land | 520 |
| Strood, London-rd.—Two f. residences | 2,450 |
| A piece of nursery ground, f. | 400 |
| F. house, shop, and premises, r. £30 p.a. | 800 |
| Cuxton-rd.—A plot of land with stabling, f., r. £30 p.a. | 310 |
| A stonemason's yard adjoining, f., r. £20 p.a. | 540 |
| "Sydenham House" and a plot of land, f., r. £45 p.a. | 1,000 |
| "Ulcomb House" and plot of land, f., r. £20 p.a. | 500 |
| Gun-la.—F. cottage, r. £26 p.a. | 470 |

MAY 27.—By G. A. WILKINSON.

| | |
|---|---|
| Hornsey—Three houses, with workshops and yard, c., r. £69. 19s. | 850 |
| Forest Hill, Honor Oak Park—"Bowden Mount," u.t. 75 yrs., g.r. £13. 10s., r. £75 p.a. | 810 |
| Upper Harefield-rd.—"Herne Villa," u.t. 65 yrs., c., g.r. £7, o.r. £50 p.a. | 535 |
| Stabling and plot of land, u.t. 65 yrs., g.r. £4, o.r. £20 p.a. | 260 |
| New Cross—37, Laurie-grove, l. | 50 |

By J. LEES.

| | |
|---|---|
| Reigate—"Pernley Cottage," f., r. £51 p.a. | 860 |

By E. WOOD.

| | |
|---|---|
| Camberwell—32 to 42 (even), Chiswell-st., u.t. 74 yrs., g.r. £36. 6s., r. £100 p.a. | 465 |
| Clapham—122, Manor-st., u.t. 10 yrs., no g.r., r. £22. 10s. p.a. | 175 |
| Buckhurst-hill—1, Charford-ter., u.t. 77 yrs., g.r. £4, r. £23 p.a. | 170 |
| Finsbury-park—2, Plimsoll-rd., u.t. 80 yrs., g.r. £5. 10s., r. £30 p.a. | 250 |

By F. C. TRAFFORD.

| | |
|---|---|
| Battersea-rise—9 and 11, Northcote-rd., l., r. £110 p.a. | 1,600 |
| Westerham, Kent—A plot of f. land, 3a. 0r. 20p. | 325 |
| Swanley—"Beaufort House," u.t. 90 yrs., g.r. £10, with possession | 225 |

MAY 28.—By C. & H. WHITE.

| | |
|---|---|
| Pimlico—33, Eaton-ter., u.t. 33 yrs., g.r. £7, r. £65 p.a. | 1,060 |
| Wandsworth—150, Trinity-rd., f., with possession | 620 |
| Walworth—52 and 53 (even), East-st., l., r. £139 p.a. | 1,680 |
| Camberwell—250, Southampton-st., l. | 980 |
| 256 to 270, Southampton-st., f. | 3,950 |
| Brixton—19 and 21, Ingleton-st., u.t. 16 yrs., g.r. £4. 8s. 6d., r. £56 p.a. | 315 |
| Vauxhall—14, Chapter-st., u.t. 17 yrs., g.r. £3, r. £30 p.a. | 190 |

By BAKE, NORRIS, & HADLEY.

| | |
|---|---|
| Forest Gate—152, Osborne-rd., u.t. 93 yrs., g.r. £5. 12s., r. £38 p.a. | 325 |

Barnsbury—62 and 64, Westbourne-rd., u.t. 70 yrs., g.r. £14, r. £86 p.a. ..... £775
Battersea—15, Almeric-rd., u.t. 236 yrs., g.r. £6. 6s., r. £33 p.a. ..... 335

By A. Booth.

Camden-rd.—Nos. 151, 153, and 155, u.t. 56 yrs., g.r. £38, r. £301 p.a. ..... 3,650

By F. Peers.

West Dulwich—27, Chancellor-rd., f., e.r. £34 p.a. ..... 320
Bucclough-rd.—"Alva" and "Elcho" cottages, f., e.r. £50 p.a. ..... 550
"Cottage Cottage," f., r. £22 p.a. ..... 275
F.g.r. of £3, with reversion in 70 yrs. to e.r. of £60 ..... 175
"Clifton Cottage," u.t. 70 yrs., g.r. £4, e.r. £30 p.a. ..... 185

By E. & H. Lumley.

Kensington—9, Pitt-st., u.t. 54 yrs., g.r. 2s. 6d., r. £35 p.a. ..... 1,250
Goring-on-Thames—Two plots of f. land, 4a. 0r. 17p. ..... 780

By W. & F. Houghton.

Loughton—"Gurner's Cottage," f., with possession ..... 310
Walthamstow—"West View," with stabling, f., e.r. £45 p.a. ..... 620

By Messrs. Foster.

Shaftesbury-avenue—6, Archer-st., f., r. £105 p.a.... 2,530
Eaton-sq.—10, Gerald-rd., u.t. 34 yrs., g.r. £8, r. £55 p.a. ..... 800

May 29.—By Goddard & Croxford.

Brentford—193 and 194, High-st., f., r. £75 p.a. ... 1,350
191 and 192, High-st., f., r. £60 p.a. ..... 1,300

By Rushworth & Stevens.

Chelsea—21, Marlborough-sq.; and 60 and 60a, Cale-st., u.t. 20 yrs., no g.r., r. £50 p.a. ..... 630

By R. Tidey & Son.

Highbury—59 and 61, Monsell-rd., f., r. £56 p.a. ... 635

By the Cheap Wood Co.

West Ham, Neville-rd.—Two f. houses, r. £84. 10s. p.a. ..... 600
12, 14, and 16, Charles-st., u.t. 88 yrs., g.r. £10. 10s., r. £39 p.a. ..... 67

By E. E. Croucher & Co.

Green-lanes, Hatherley-rd.—A plot of f. land, 2a. 0r. 21p. ..... 400

By F. Jolly & Co.

Upper Clapton—95, Cazenove-rd., u.t. 84 yrs., g.r. £14, e.r. £90 p.a. ..... 980
Hackney—107, King Edward-rd., u.t. 50 yrs., g.r. £6. 10s., e.r. £45 p.a. ..... 375
70, Lauriston-rd., u.t. 53 yrs., g.r. £7, e.r. £48 p.a. 330

By Jones & Son.

Mile-end—95, Turner's-rd., u.t. 76 yrs., g.r. £4, 10s., r. £30 p.a. ..... 260
Limehouse—25 and 26, Dixon-st., u.t. 68 yrs., g.r. £6. 8s., r. £61 p.a. ..... 515
45 and 46, Dixon-st., u.t. 69 yrs., g.r. £6. 8s., r. £62 p.a. ..... 595
37 and 39, Copenhagen-pl., u.t. 51 yrs., g.r. £6, r. £57 p.a. ..... 335

May 30.—By Eastman Brothers.

Bethnal-green—102 and 112, Green-st., u.t. 38 yrs., g.r. £10. 6s., r. £85 p.a. ..... 485

By Geo. Gordon & Co.

Plumstead—2, St John's-villas, f., r. £22 p.a. ..... 345

By G. Pearce & Son.

Hoxton—30, Gifford-st., u.t. 11 yrs., g.r. £5. 10s., r. £24 p.a. ..... 60

By Newbon & Harding.

Holloway—A profit rental of £70 p.a., u.t. 75 yrs... 1,270
Finsbury-pk.—6, Adolphus-rd., u.t. 64 yrs., g.r. £10. 10s., r. £52. 10s. p.a. ..... 475
Hoxton—15 and 16, Buckland-st., u.t. 46 yrs., g.r. £10, r. £74 p.a. ..... 700
Islington—16, Theberton-st., u.t. 29 yrs., g.r. £8, r. £46 p.a. ..... 405
Kingsland—87, 89, 95, and 97, Culford-rd., u.t. 31 yrs., g.r. £8, r. £126 p.a. ..... 1,055
101 to 107 (odd), Culford-rd., u.t. 31 yrs., g.r. £9. 10s., r. £128 p.a. ..... 1,170
41, Ufton-rd., u.t. 31 yrs., g.r. £3. 10s., e.r. £32 p.a. ..... 255
l.g.r. of £25, u.t. 30 yrs., at a g.r. of £14 p.a..... 140
l.g.r. of £5. 5s., u.t. 26 yrs, at a g.r. of 5s. p.a.... 60

By E. Stimson.

Clerkenwell—L.g.r. of £40, u.t. 22 yrs. ..... 470
Gray's-inn-rd.—12, Wilson-st., u.t. 21 yrs., g.r. £3, r. £40 p.a. ..... 370
Chislehurst, Church-row—"Lime Villa," u.t. 51 yrs., g.r. £5, r. £50 p.a. ..... 550
South Lambeth—"The Mawbey Arms," f., r. £25 p.a. ..... 310
Westminster—L.g.r. of £55, u.t. 9 yrs., at a g.r. of 5s. p.a. ..... 225
Kingsland-road—L.g.r. of £75, u.t. 17 yrs., at a g.r. of £45 p.a. ..... 200
66, Tottenham-rd., u.t. 30 yrs., g.r. £5, r. £30 p.a. 215
Walworth—6, Sutherland-sq., u.t. 53 yrs., g.r. £4, r. £42 p.a. ..... 240

May 31.—By F. Hodson.

New Southgate—1, Bella-villas, u.t. 90 yrs, g.r. £8, r. £32 p.a. ..... 280
9, Bella-villas, u.t. 90 yrs., g.r. £8, with possession ..... 210
The residence called "Parkhurst," f., with possession ..... 450
Parkhurst-road—Two plots of f. land ..... 60

By Bray, Young, & Co.

Chelsea—76, Church-st., u.t. 18 yrs., no g.r., r. £45 p.a. ..... 250

By Baker & Sons.

Isleworth—An enclosure of land, 9a. 3r. 14p., f. ... 2,100
New Southgate—1, 2, and 3, Oak-cottages, u.t. 79 yrs., g.r. £15, r. £60 p.a. ..... 140
1 to 4, Vine-cottages, u.t. 79 yrs., g.r. £14, r. £73 200
1 to 10, Ely-pl., u.t. 63 yrs., g.r. £30. 15s., r. £135 p.a. ..... 260

By Ward & Clarke.

Willesden—19, Waldo-rd., f., r. £36 p.a. ..... 210
23 to 29 (odd), Waldo-rd., f., r. £130 p.a. ..... 195
39, 41, and 43, Waldo-rd., f., r. £78 p.a. ..... 220

[*Contractions used in this list.*—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; e.r. for estimated rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; yd. for yard, &c.]

## MEETINGS.

Saturday, June 8.

*Association of Public Sanitary Inspectors.*—Fourth Annual Provincial Meeting at Chelmsford.

*Workmen's and Apprentices' Exhibition, People's Palace, Mile End.*—Opening by Lord Brassey. 4 p.m.

Thursday, June 13.

*Society for the Encouragement of the Fine Arts.*—Morning meeting.

Saturday, June 15.

*Architectural Association.*—Vacation Visit to Elizabethan mansion at Parham, Sussex (see advt.)

*Royal Institution.*—Professor W. Knight on "Idealism and Experience in Art and Life." 3 p.m.

# Miscellanea.

**The Association of Public Sanitary Inspectors of Great Britain.**—The fourth annual Provincial Meeting of this Association will be held at Chelmsford on this Saturday, the 8th inst. His Worship the Mayor of Chelmsford, Mr. Frederic Chancellor, F.R.I.B.A., will receive the members in the Corn Exchange at 10.30 a.m., and addresses are expected from Dr. Richardson, F.R.S., Dr. Alfred Carpenter, J.P., Mr. William J. Beadel, M.P., and other gentlemen. Dr. A. Downes will also make some remarks on "Sanitation in Chelmsford." After luncheon the members will inspect the new Union buildings, under the direction of the architect (His Worship the Mayor). The members will then visit the Baddow Water Tower, which will be described by the engineers (Mr. Councillor Whitmore and Mr. C. Pertwee). They will next proceed to the Chelmsford Sewage Farm, under the guidance of Mr. Alderman Durrant, Chairman of the Joint Sewage Committee, and Mr. C. Pertwee, the Borough Engineer. If time permits, a visit will also be made to the new waterworks.

**The Iron, Hardware, and Metal Trades' Pension Society.**—On the 29th ult. the subscribers and friends of this well-established and admirable institution met to celebrate their annual festival. For forty-six years this charity has been in existence, and through it no less a sum than 120,000*l.* has been contributed for charitable purposes. During last year alone 138 families have been assisted, all the recipients being over 60 years of age. In the majority of cases families who had at one time been in affluence, but who had been reduced by commercial losses, had been saved from the workhouse. The chairman on the occasion mentioned was Mr. John Aird, M.P., who contributed (personally and by collection) a hundred guineas to the funds. Many established and well-known members of the trade were present, and during the evening Mr. T. Hodges Papworth, the secretary, announced a subscription-list of 650*l.* There is however, it is stated, much real necessity for further support being given to the Society.

**Important Sale of Pictures.**—Messrs. Boussod & Valadon send us a catalogue of pictures, the property of M. Secrétan of Paris, which are to be sold by auction in Paris at the end of June or beginning of July. This includes no less than thirty-one pictures by Meissonnier; four by Corot, six by Rousseau, nine by Troyon &c. The names of Decamps and Delacroix also figure pretty largely, but we imagine these are sketches rather than pictures; a great number of sketches by Decamps are going about, but the finished pictures are not numerous. There are other works by Diaz, Fortuny, Ingres, Isabey, Gerard Dow, Metsu, Millet &c.

**Main Drainage, St. Helens, Lancashire.**—At a meeting of the St. Helens Town Council, held on Wednesday last, it was decided to apply to the Local Government Board for leave to borrow the sum of 32,300*l.*, for the purpose of constructing a main intercepting sewer, tanks, &c., for the main drainage of the borough, in accordance with the scheme prepared by Mr. Geo. J. C. Broom, Assoc.M.Inst. C.E., F.G.S., the Borough Engineer.

**Builders' Ironmongery, Sanitary Fittings, &c.**—Messrs. Young & Marten, of Stratford, have sent us their "Tariff No. 11, June 1st, 1889," which is a useful and well-arranged priced catalogue of selections of stock articles used by builders. Although it is only an extract from their larger general catalogue, it will repay perusal.

**Workmen's and Apprentices' Exhibition at the People's Palace.**—The second Workmen's and Apprentices' Exhibition is to be opened at the People's Palace, Mile End, on this Saturday, the 8th inst., at 4 p.m., by Lord Brassey.

**New Swiss Patent Law.**—A new law relating to patents has just come into force in Switzerland, of which the following clauses are the most important:—*Section* 2: An invention is not considered new in Switzerland, when, on the patentee making the application, such invention is already sufficiently known to be executed by another expert. *Section* 6: The patent right remains in force for fifteen years, reckoned from the date of application. For the patent right 20 francs is first paid and an additional 20 francs for the first year; second year, 30 francs; third year, 40 francs; and a similar sum annually till the fifteenth year, when 150 francs have to be paid. *Section* 7: When the patentee effects an improvement on his invention the fee of 20 francs is not demanded. *Section* 9: The patent ceases: (1) When the patentee makes request to that effect in writing to the Patent Commission; (2) when the annual charge is not paid within three months after each year. *Section* 10: In the subjoined instances the patent right becomes void: (1) When it be shown that the invention is not a new one; (2) if it be shown that the patentee is not the inventor or the one responsible for the invention; (3) if any one has obtained a patent on an object which in the application has been given a different denomination than it ought to have, with the object of deceiving the public or of deteriorating the value of some other truly valuable invention; (4) if the drawing or description of the invention patented, deposited simultaneously with the application, is shown not to be sufficiently clear to be executed by an expert, or do not correspond with the model. *Section* 17: If the Patent Commission finds that the object in question cannot be patented for some reason or another, the applicant will, as soon as possible, receive the Commission's confidential reason for the refusal, when he may amend the invention.

**International Factory Law Conference.**—As early as 1881 the Swiss Government issued an invitation to several European States to assemble in conference, in order to frame a common law respecting factory labour, but it would seem that at that time the subject was not ripe for discussion. Since then, however, a great deal of legislation in this direction has been effected in various countries, and in consequence the Swiss Government has issued a fresh invitation to all the States of Europe to send delegates to a Conference in Bern next September in order to discuss the following five points, viz. (1), prohibition of all Sunday labour in factories, works, mines, &c.; (2) fixing of a minimum age for children employed, and the curtailment of the hours of labour for young persons; (3) prohibition of employment of minors and women in all industries injurious to health; (4) curtailment of nightwork; (5) how the programme may best be carried into law. It is understood that most of the Governments of Europe have accepted the invitation.

**The Late Sir Charles Lanyon.**—At the ordinary Council meeting of the Royal Institute of the Architects of Ireland, held on Monday, June 3, Mr. T. Drew, Fellow, in the chair, the following resolution was passed unanimously:—"The Council desire, on behalf of the Fellows and Members of the Royal Institute of the Architects of Ireland, to place on record the feeling of regret which has been evoked by the announcement of the death at Belfast of Sir Charles Lanyon, J.P., D.L., F.R.I.B.A., R.H.A., and Fellow and a past President of this Institute, and connected with it from its foundation fifty years ago. It is felt that in the past half-century, Mr., and in more recent years Sir, Charles Lanyon, has filled a foremost place in the history of the profession in Ireland, and has upheld its character by the excellence of his works and by his high-minded and loyal support to his brethren in the architectural profession."

**The Crystal Palace.**—On Whit Monday, June 10, it will be thirty-five years since the Queen, speaking beneath the great arch of the centre transept, declared the Crystal Palace open, and expressed the hope that the enterprise would elevate and instruct as well as delight and amuse all classes of her subjects. In celebration of this anniversary an attractive programme for the holiday folk has been put forth.

**The Prince's Club, Knightsbridge.**—We are again obliged to hold over our description of this club.

**The Expansion of Timber.**—Some experiments on the expansion of timber, caused by the absorption of water, have recently been made by Professor De Volson Wood in the Department of Tests of the Stevens Institute of Technology (U.S.). The results were reported to the recent Convention of the American Society of Mechanical Engineers. Two specimens, each of pine, oak, and chestnut, each about 3 ft. long and 6 in. wide, and fairly well seasoned, were kept in a dry, warm room for about three weeks, and then immersed in water for thirty-seven days. From measurements made immediately before and after immersion the following percentages of longitudinal expansion were obtained:—Pine, 0·065; oak, 0·085; chestnut, 0·165. The percentages of expansion laterally were:—Pine, 2·6; oak, 3·5; chestnut, 3·65. Unfortunately the varieties of pine, oak, and chestnut experimented upon are not given.

## PRICES CURRENT OF MATERIALS.

| TIMBER. | £. | s. | d. | £. | s. | d. |
|---|---|---|---|---|---|---|
| Greenheart, B.G. ....ton | 6 | 10 | 0 | 7 | 10 | 0 |
| Teak, E.I.....load | 11 | 0 | 0 | 15 | 0 | 0 |
| Sequoia, U.S.....foot cube | 0 | 2 | 3 | 0 | 3 | 0 |
| Ash, Canada.....load | 3 | 10 | 0 | 5 | 0 | 0 |
| Birch ,, ..... | 3 | 10 | 0 | 6 | 0 | 0 |
| Elm ,, ..... | 4 | 0 | 0 | 5 | 0 | 0 |
| Fir, Dantsic, &c. ..... | 2 | 0 | 0 | 3 | 10 | 0 |
| Oak ,, ..... | 2 | 10 | 0 | 4 | 10 | 0 |
| Canada ..... | 5 | 10 | 0 | 7 | 10 | 0 |
| Pine, Canada red ..... | 3 | 5 | 0 | 4 | 0 | 0 |
| ,, yellow ..... | 3 | 10 | 0 | 5 | 10 | 0 |
| Lath, Dantsic.....fathom | 4 | 10 | 0 | 5 | 10 | 0 |
| St. Petersburg..... | 5 | 0 | 0 | 6 | 10 | 0 |
| Wainscot, Riga, &c.....log | 2 | 15 | 0 | 4 | 5 | 0 |
| Deals, Finland, 2nd and 1st...std.100 | 9 | 10 | 0 | 11 | 0 | 0 |
| ,, ,, 4th and 3rd..... | 6 | 0 | 0 | 9 | 0 | 0 |
| Riga ..... | 7 | 10 | 0 | 9 | 0 | 0 |
| St. Petersburg, 1st yellow ..... | 11 | 0 | 0 | 15 | 0 | 0 |
| ,, 2nd ,, ..... | 10 | 0 | 0 | 11 | 0 | 0 |
| ,, white ..... | 7 | 10 | 0 | 10 | 10 | 0 |
| Swedish ..... | 9 | 0 | 0 | 16 | 0 | 0 |
| White Sea ..... | 9 | 10 | 0 | 17 | 0 | 0 |
| Canada, Pine, 1st ..... | 16 | 0 | 0 | 28 | 10 | 0 |
| ,, ,, 2nd ..... | 11 | 0 | 0 | 17 | 10 | 0 |
| ,, ,, 3rd, &c. ..... | 6 | 0 | 0 | 10 | 10 | 0 |
| ,, Spruce, 1st ..... | 9 | 10 | 0 | 11 | 0 | 0 |
| ,, ,, 3rd and 2nd ..... | 7 | 10 | 0 | 9 | 0 | 0 |
| New Brunswick, &c..... | 6 | 15 | 0 | 8 | 15 | 0 |
| Battens, all kinds ..... | 6 | 10 | 0 | 20 | 0 | 0 |
| Flooring Boards, sq., 1 in., prepared, First ..... | 0 | 11 | 0 | 0 | 14 | 6 |
| Second ..... | 0 | 8 | 0 | 0 | 10 | 9 |
| Other qualities ..... | 0 | 5 | 6 | 0 | 7 | 9 |
| Cedar, Cuba.....foot | 0 | 0 | 4½ | 0 | 0 | 4½ |
| Honduras, &c..... | 0 | 0 | 4 | 0 | 0 | 4½ |
| Mahogany, Cuba ..... | 0 | 0 | 4½ | 0 | 0 | 6½ |
| St. Domingo, cargo average ..... | 0 | 0 | 4½ | 0 | 0 | 6½ |
| Mexican ,, ..... | 0 | 0 | 4½ | 0 | 0 | 5½ |
| Tobasco ,, ..... | 0 | 0 | 5½ | 0 | 0 | 6½ |
| Honduras ,, ..... | 0 | 0 | 5½ | 0 | 0 | 6½ |
| Box, Turkey .....ton | 4 | 0 | 0 | 12 | 0 | 0 |
| Rose, Rio..... | 15 | 0 | 0 | 20 | 0 | 0 |
| Bahia ..... | 14 | 0 | 0 | 16 | 0 | 0 |
| Satin, St. Domingo .....foot | 0 | 0 | 6 | 0 | 1 | 0 |
| Porto Rico ..... | 0 | 0 | 9 | 0 | 1 | 3 |
| Walnut, Italian ..... | 0 | 0 | 4½ | 0 | 0 | 6½ |
| **METALS.** | | | | | | |
| IRON—Bar, Welsh, in London...ton | 5 | 5 | 0 | 5 | 10 | 0 |
| ,, ,, at works in Wales ... | 4 | 15 | 0 | 5 | 0 | 0 |
| ,, Staffordshire, in London ... | 5 | 10 | 0 | 6 | 10 | 0 |
| COPPER— | | | | | | |
| British, cake and ingot..... ton | 45 | 0 | 0 | 46 | 0 | 0 |
| Best selected ..... | 47 | 0 | 0 | 47 | 10 | 0 |
| Sheets, strong ..... | 53 | 0 | 0 | 53 | 0 | 0 |
| Chili, bars ..... | 41 | 15 | 0 | 0 | 0 | 0 |
| YELLOW METAL.....lb. | 0 | 0 | 5 | 0 | 0 | 5½ |
| LEAD—Sheet, English.....ton | 13 | 10 | 0 | 14 | 0 | 0 |
| SPELTER— | | | | | | |
| Silesian, special .....ton | 18 | 2 | 6 | 0 | 0 | 0 |
| Ordinary brands..... | 18 | 0 | 0 | 0 | 0 | 0 |
| TIN— | | | | | | |
| Straits .....ton | 91 | 0 | 0 | 0 | 0 | 0 |
| Australian ..... | 91 | 10 | 0 | 0 | 0 | 0 |
| English Ingots..... | 95 | 0 | 0 | 0 | 0 | 0 |
| ZINC—English sheet .....ton | 21 | 0 | 0 | 22 | 0 | 0 |
| **OILS.** | | | | | | |
| Linseed .....ton | 20 | 2 | 6 | 20 | 5 | 0 |
| Cocoanut, Cochin ..... | 26 | 10 | 0 | 28 | 0 | 0 |
| Ceylon ..... | 24 | 10 | 0 | 24 | 15 | 0 |
| Palm, Lagos ..... | 24 | 0 | 0 | 25 | 0 | 0 |
| Rapeseed, English pale ..... | 27 | 10 | 0 | 29 | 0 | 0 |
| ,, brown ..... | 26 | 0 | 0 | 26 | 10 | 0 |
| Cottonseed, refined ..... | 25 | 10 | 0 | 26 | 15 | 0 |
| Tallow and Oleine ..... | 19 | 0 | 0 | 45 | 0 | 0 |
| Lubricating, U.S. ..... | 5 | 0 | 0 | 8 | 0 | 0 |
| ,, refined ..... | 7 | 0 | 0 | 13 | 0 | 0 |
| TAR—Stockholm.....barrel | 1 | 2 | 0 | 1 | 3 | 6 |
| Archangel ..... | 0 | 15 | 9 | 0 | 16 | 0 |

## TENDERS.

[Communications for insertion under this heading must reach us *not later than* 12 *Noon on Thursdays.*]

ASHTON-UNDER-LYNE.—For the extension of Trafalgar day-schools. Mr. J. H. Burton, architect, Warrington-street, Ashton-under-Lyne:—

| | |
|---|---|
| J. W. Williamson, Ashton-under-Lyne ..... | £660 0 0 |
| James Gibson, Dunkinfield ..... | 650 0 0 |
| Allen Holmes, Ashton-under-Lyne ... | 598 0 0 |
| John Robinson, Ashton-under-Lyne* | 570 0 0 |

* Accepted.

CLEVEDON (Somerset).—For sanitary repairs and alterations at three villa residences. Messrs. James Hoddell & Co., architects, Clevedon:—

| | |
|---|---|
| T. Hill ..... | £143 0 0 |
| Harry Elston..... | 135 0 0 |
| Hardwidge & Tanner (accepted)..... | 130 0 0 |

# CONTRACTS AND PUBLIC APPOINTMENTS.

*Epitome of Advertisements in this Number.*

## CONTRACTS.

| Nature of Work, or Materials. | By whom Required. | Architect, Surveyor, or Engineer. | Tenders to be delivered. | Page. |
|---|---|---|---|---|
| Tar Paving ..... | Willesden Local Board | O. Claude Robson..... | June 11th | ii. |
| Brick-lined Concrete, &c., Pipe Sewers..... | West Ham Council..... | L. Angell ..... | do. | ii. |
| Guernsey Granite ..... | Brentford Union ..... | *Official* ..... | do. | x. |
| Firewood ..... | do. | do. | do. | x. |
| Drainage Works..... | Central London Dist. School, Hanwell ..... | do. | do. | ii. |
| Earthenware Sewer Pipes ..... | Belfast Corporation ... | J. C. Brotland ..... | do. | x. |
| Street Improvements ..... | Chesham Local Board | T. Bennett..... | do. | ii. |
| Blue Guernsey Granite Spalls ..... | West Ham Union..... | *Official* ..... | June 12th | ii. |
| Sewerage Works ..... | Sevenoaks R.S.A. ..... | T. Hennell..... | June 18th | x. |
| Cast-iron Pipes, &c..... | Southampton Corp..... | W. Matthews ..... | do. | x. |
| Enlargement of Post Office, Walsall ..... | Com. of H.M. Works | *Official* ..... | do. | ii. |
| Asphalting and Tarpaving Works ..... | Tottenham Local Board | J. E. Worth ..... | do. | x. |
| Wood Paving and Asphalte Paving ..... | St. Margaret, &c. (Westminster) Vestry..... | G. R. W. Wheeler ..... | June 19th | ii. |
| Roads and Drains ..... | Not stated ..... | T. Thompson..... | June 20th | x. |
| Painting, &c. ..... | Met. Asylums Board... | *Official* ..... | do. | x. |
| Swimming Bath, &c. ..... | St. John's, Hampstead | Mr. Spalding..... | June 21st | x. |
| Widening Bridge ..... | Cumberland Coun. Co. | *Official* ..... | June 22nd | x. |
| Broken Granite ..... | Newmarket Local Board | do. | do. | ii. |
| Erection of Board School ..... | Reading School Board | S. S. Stallwood..... | June 24th | x. |
| Engine and Boiler House, &c. ..... | Borough of West Ham | L. Angell ..... | June 26th | x. |
| Timber Groynes on Sea Front ..... | Level of Romney Marsh | H. D. Good ..... | June 27th | x. |
| New Outlet Sluice, Watercourse, &c..... | Havering & Dagenham Com. of Sewers..... | J. Hickman Barnes ... | July 1st | x. |
| Painting, Repairs, &c..... | Central London Sick Asylum District ..... | *Official* ..... | do. | x. |
| New Municipal Offices ..... | York Corporation ..... | do. | do. | x. |
| Yorkshire Flagging ..... | Croydon Corporation ... | W. Powell..... | July 2nd | ii. |
| Painting, &c., Works, Gosport ..... | War Department..... | *Official* ..... | Not stated. | ii. |
| Painting, &c., Works, Colchester..... | do. | do. | do. | ii. |
| Alteration to Bar, &c. ..... | Not stated ..... | ..... | ..... | x. |

## PUBLIC APPOINTMENTS.

| Nature of Appointment. | By whom Advertised. | Salary. | Applications to be in. | Page. |
|---|---|---|---|---|
| Waste-water Inspector and Turncock ..... | Ely Local Board ..... | Not stated ..... | June 10th | xvi. |
| Temporary Assist. in Boro' Surveyor's Office | Walsall Corporation ... | 2l. per week ..... | June 14th | xvi. |
| Surveyor and Engineer ..... | Sutton Coldfield Corp. | 200l. ..... | June 20th | xvi. |
| Surveyor of Highways..... | Mortlake Highway Bd. | 150l. ..... | June 22nd | xvi. |

HAMPTON WICK.—For constructing the Hampton Wick Sewerage Works, on the Shone hydro-pneumatic system. Mr. R. T. Elsam, surveyor, Local Board Office, Hampton Wick. Mr. Isaac Shone, Consulting Engineer, Westminster. Quantities for No. 4 Contract by the Surveyor:—

| | Contract No. 1. | Contract No. 2. | Contract No. 3. | Contract No. 4. |
|---|---|---|---|---|
| Chas. Dickenson, Mortlake ..... | — | — | — | £9,700 0 0 |
| Botterill, Cannon-street, E.C..... | — | — | — | 8,766 0 0 |
| A. Kellett, Ealing ..... | £877 2 6 | — | — | 8,187 17 10 |
| L. Bottoms, Wandsworth-common..... | — | — | — | 7,947 5 10½ |
| J. W. & J. Neave, Leytonstone ..... | 1,190 10 0 | — | — | 7,450 0 0 |
| W. Carter, Anerley-road ..... | — | — | — | 7,288 19 0 |
| W. Gibson, Exeter ..... | — | — | — | 6,820 0 0 |
| H. Hill, Maidenhead ..... | 826 10 0 | — | — | 6,723 0 0 |
| E. & W. Iles, South Wimbledon ..... | — | — | — | 6,713 0 0 |
| J. Piller, Teddington ..... | — | — | — | 6,520 0 0 |
| Kirk & Randall, Woolwich..... | 859 0 0 | — | — | 4,734 0 0 |
| W. Cunliffe, Dorking ..... | 695 0 0* | — | — | 4,078 0 0* |
| James Armer, 52, Cannon-street..... | — | — | 1,050 0 0 | — |
| Manlove, Alliot, & Co., Nottingham ..... | — | — | 768 0 0 | — |
| J. Atkinson & Co., Gospel Oak, London ..... | — | — | 748 0 0 | — |
| Crossley Bros., Manchester..... | — | — | 693 0 0* | — |
| Hughes & Lancaster, Chester ..... | 1,014 1 3 | 764 9 0* | — | — |

* Accepted.

CRICKLEWOOD.—For building house in the Edgware-road, Cricklewood, N.W., for Miss Marrion. Mr. Geo. S. Finlay, architect:—

| | |
|---|---|
| Tennant & Co. ..... | £2,498 0 0 |
| Woodward & Co. ..... | 2,489 0 0 |
| H. & E. Lee ..... | 2,467 0 0 |
| Higgs & Hill ..... | 2,484 0 0 |
| Bywaters ..... | 2,483 0 0 |
| Prestage & Co. ..... | 2,350 0 0 |

CROYDON.—For the erection of two villa residences, Campden-road, for Mr. J. Kendall. Mr. E. C. Homer, architect, 99, Gresham-street, E.C.:—

| | |
|---|---|
| H. Weaver (accepted) ..... | £2,157 0 0 |

GILLINGHAM (Kent).—For erecting the nave, aisles, narthex, and west porches of St. Barnabas' Church. Messrs. J. E. K. and J. P. Cutts, architects:—

| | |
|---|---|
| J. Tyerman, London ..... | £3,119 0 0 |
| W. C. Snow, New Brompton ..... | 2,920 0 0 |
| Bunning & Son, London..... | 2,848 0 0 |
| Wallis & Sons, Maidstone..... | 2,839 0 0 |
| Naylor & Son, Rochester ..... | 2,699 0 0 |
| C. E. Skinner, Chatham (accepted) | 2,550 0 0 |

HILDENBOROUGH.—For erecting farm buildings and cottage at Horns Lodge, Hildenborough, Kent, for Lord Arthur Cecil. Mr. G. St. Pierre Harris, architect, 1, Basinghall-street. Quantities by Messrs. C. Stanger & Son, surveyors, 21, Finsbury-pavement, E.C.:—

| | |
|---|---|
| S. J. Jerrard, Lewisham ..... | £8,983 0 0 |
| W. & F. Croaker, London ..... | 8,736 0 0 |
| T. Otway, Chislehurst..... | 8,710 0 0 |
| Somerford & Son, Clapham ..... | 8,600 0 0 |
| W. Holt, Croydon ..... | 8,300 0 0 |
| W. Wiltshire, Sevenoaks ..... | 8,000 0 0 |
| R. Durtnell, Bexley ..... | 7,977 0 0 |
| T. Gregory & Co., Clapham..... | 7,677 0 0 |

HINCKLEY.—For painting and decoration in sitting and bedrooms at Higham Grange, for the Hon. H. H. Pierrepont:—

| | |
|---|---|
| C. Hindley & Sons (accepted) ..... | £30 0 0 |

ILFORD.—For the erection of three shops in The Broadway, Ilford, for Mr. A. North. Mr. F. Watkins, architect:—

| | |
|---|---|
| Walters, Barkingside ..... | £1,350 0 0 |
| North Bros., Stratford ..... | 1,235 0 0 |
| W. Watson, Ilford (accepted)..... | 1,197 0 0 |

LONDON.—For additions and alterations to the Union Workhouse, Poplar, for the Guardians. Messrs. W. A. Hills & Son, 149, Bow-road, E., architects. Quantities supplied by Mr. H. Poston, 20, Lombard-street, E.C.:—

| | |
|---|---|
| Bruce & Sons ..... | £26,500 0 0 |
| J. E. Chappell..... | 24,900 0 0 |
| Allen & Sons ..... | 24,870 0 0 |
| M. Gentry ..... | 24,150 0 0 |
| Perry & Co..... | 23,990 0 0 |
| Kirk & Randall ..... | 23,977 0 0 |
| W. Shurmur, Clapton (accepted)... | 23,979 0 0 |

LONDON.—For alterations to the "Enterprise" public-house, Walton-street, Chelsea, for Mr. J. F. Richter. Mr. T. H. Smith, architect, 17 and 18, Basinghall-street, E.C.:—

| | |
|---|---|
| Hammond ..... | £398 0 0 |
| Tuttle & Appleton ..... | 245 0 0 |
| W. H. Smith (accepted) ..... | 209 15 0 |

LONDON.—For repairs and alterations at "Claremont," Bancroft-park, South Norwood, for Mr. W. H. Withall, under the superintendence of Mr. Parnacott, surveyor, 156, Westminster Bridge-road:—

| | |
|---|---|
| Read ..... | £108 19 6 |
| Peacock Bros. ..... | 101 10 0 |

LONDON.—For alterations, repairs, &c., at 41, Harleyford-road, Kennington. Mr. Wm. West, architect and surveyor, 19, Craven-street, Strand:—

| | |
|---|---|
| Wm. Smith ..... | £630 0 0 |
| J. & H. Cocks ..... | 620 0 0 |
| Manley & Son ..... | 597 0 0 |
| Spencer & Co. (accepted) ..... | 540 0 0 |

LONDON.—For rebuilding No. 131, Finsbury-pavement, for Messrs. Warner Bros. Mr. T. H. Smith, architect, 17 and 18, Basinghall-street, E.C.:—

| | |
|---|---|
| Allen & Sons (accepted) | £2,424 0 0 |

LONDON.—For part rebuilding No. 11, Little St. Andrew's-street, St. Martin's-lane, W.C. Mr. Richard Peters, architect, 72, Wool Exchange, Coleman-street, E.C.:—

| | |
|---|---|
| Watson | £485 0 0 |
| Longland | 437 0 0 |
| Croft | 383 0 0 |
| Hood | 381 0 0 |
| Marston | 369 0 0 |

LONDON.—For alterations to 7, New Basinghall-street, E.C. Mr. Richard Peters, architect, 72, Wool Exchange, Coleman-street, E.C.:—

| | |
|---|---|
| Watson | £380 0 0 |
| Croft | 335 0 0 |
| Bishop Bros. & Marston | 289 0 0 |
| Lascelles | 277 10 0 |
| Hood | 225 0 0 |

LONDON.—For alterations, &c., at the "Garrick," Leman-street, Whitechapel. Mr. Wm. West, architect and surveyor, 19, Craven-street, Strand:—

| | |
|---|---|
| J. Beale | £490 0 0 |
| Drew & Cadman | 449 0 0 |

LONDON.—For the erection of warehouse in Banner-street, St. Luke's, for Messrs. Maxwell & Son. Mr. C. H. Flack, architect. Quantities by Mr. H. R. Messenger:—

| | |
|---|---|
| Patman & Fotheringham | £2,529 0 0 |
| Newton | 2,453 0 0 |
| J. M rter | 2,434 0 0 |
| W. Downs | 2,430 0 0 |
| Balaam Bros | 2,393 0 0 |
| Burton & Co. | 2,385 0 0 |
| Sawyer | 2,353 0 0 |

LOUGHBOROUGH.—For alterations at West Leake House, Loughborough, for the Dowager Lady Belper. Mr. Henry Hall, architect, 19, Doughty-street, London, W.C.:—

| | |
|---|---|
| Walker & Slater, Derby (accepted) | £585 0 0 |

[No competition.]

MARDEN PARK (Surrey).—For the erection of a residence on the Marden Park Estate, for Mr. G. H. Stuart. Mr. Frederick Rogers, architect. Quantities by Mr. Fred. Cartwright, 89, Chancery-lane, W.C.:—

| | |
|---|---|
| Cloke & Winkle, Westerham | £688 0 0 |
| Maides & Harper, Croydon | 687 0 0 |
| W. A. Grubb, Bromley | 673 0 0 |
| E. Bye, Bromley | 669 0 0 |
| J. & J. Ward, Warlingham | 643 0 0 |
| J. Brasier, Oxted | 627 0 0 |

RICHMOND.—For alterations and additions at the Richmond Union Workhouse. Mr. E. Maynard, architect, College-chambers, Richmond:—

| | |
|---|---|
| Lansdown & Co. | £1,129 0 0 |
| Sweet & Loder | 1,045 0 0 |
| Scharien & Co. | 1,028 0 0 |
| Carman | 985 0 0 |
| Collinson | 965 0 0 |
| Lillywhite | 965 0 0 |
| Hunt (accepted) | 957 0 0 |

SYDENHAM.—For rebuilding the "Fox and Hounds" public-house, High-street, Sydenham, for Mr. E. W. White. Mr. T. H. Smith, architect, 17 and 18, Basinghall-street, E.C. Quantities by E. G. Thompson:—

| | |
|---|---|
| Redman | £3,849 0 0 |
| Kennard | 3,750 0 0 |
| Burman & Sons | 3,730 0 0 |
| Smith & Sons | 3,565 0 0 |
| Spencer & Co. | 3,540 0 0 |
| Turtle & Appleton | 3,470 0 0 |
| Waddington & Co. | 3,470 0 0 |
| Holliday & Greenwood | 3,450 0 0 |
| Tarrant | 3,448 0 0 |
| Allen & Sons | 3,356 0 0 |

WEST KIRBY.—For erecting Wesleyan schools and class-rooms at West Kirby. Mr. John Wills, architect, Derby:—

| | |
|---|---|
| W. Christian, West Kirby (accepted) | £915 0 0 |

WARLINGHAM.—For bungalow residence, Warlingham, for Mr. Worthington Church. Mr. Ernest H. Abbott, architect, 6, Warwick-court, Holborn. Quantities by Mr. A. Johnson:—

| | |
|---|---|
| F. & H. F. Higgs | £1,460 0 0 |
| Hunter & Bryant | 1,400 0 0 |
| J. Churchill | 1,398 0 0 |
| J. & J. Ward | 1,330 0 0 |
| C. E. Scrivener | 1,260 0 0 |
| C. Oldridge & Sons | 1,244 0 0 |

WARLINGHAM.—For bungalow residence, Warlingham, for Mr. Worthington Church. Mr. Ernest H. Abbott, architect, 6, Warwick-court, Holborn. Quantities by Mr. A. Johnson:—

| | |
|---|---|
| C. E. Scrivener | £1,680 0 0 |
| F. & H. F. Higgs | 1,590 0 0 |
| Hunter & Bryant | 1,581 0 0 |
| J. & J. Ward | 1,472 0 0 |
| C. Oldridge & Sons | 1,424 0 0 |

SUBSCRIBERS in LONDON and the SUBURBS, by prepaying at the Publishing Office, 19s. per annum (or 4s. 9d. per quarter), can ensure receiving "The Builder" by *Friday Morning's post.*

## TO CORRESPONDENTS.

F. P.—F. C. P.—H. & P. (below our mark).—J. C. N. (ditto).—J. S.—F. H. B. (we sympathise greatly, but we fear it would not be wise to publish your letter).—E. S. J. (next week).—A. L. G. (too late for this week).

All statements of facts, lists of tenders, &c. must be accompanied by the name and address of the sender, not necessarily for publication.

We are compelled to decline pointing out books and giving addresses.

NOTE.—The responsibility of signed articles, and papers read at public meetings, rests, of course, with the authors.

*We cannot undertake to return rejected communications.*

Letters or communications (beyond mere news-items) which have been duplicated for other journals, are NOT DESIRED.

All communications regarding literary and artistic matters should be addressed to THE EDITOR; all communications relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and not to the Editor.

## TERMS OF SUBSCRIPTION.

"THE BUILDER" is supplied DIRECT from the Office to residents in any part of the United Kingdom at the rate of 19s. per annum PREPAID. To all parts of Europe, America, Australia, and New Zealand, 26s. per annum. To India, China, Ceylon, &c. 30s. per annum. Remittances payable to DOUGLAS FOURDRINIER, Publisher, No. 46, Catherine-street, W.C.

**SPRAGUE & CO.,**

PHOTOLITHOGRAPHERS,

22, Martin's-lane,

Cannon-street, E.C. [ADVT.

**W. H. Lascelles & Co.**

121, BUNHILL ROW, LONDON, E.C.

Telephone No. 270.

HIGH-CLASS JOINERY.

LASCELLES' CONCRETE.

Architects' Designs are carried out with the greatest care.

CONSERVATORIES,
GREENHOUSES,
WOODEN BUILDINGS,

**Bank, Office, & Shop Fittings.**

**CHURCH BENCHES & PULPITS.**

ESTIMATES GIVEN ON APPLICATION.

**BEST BATH STONE.**

CORSHAM DOWN. | FARLEIGH DOWN.
BOX GROUND. | COMBE DOWN.
WESTWOOD GROUND. | STOKE GROUND.

**THE BATH STONE FIRMS, Limited.**

HEAD OFFICES: BATH.

**DOULTING FREESTONE.**

THE CHELYNCH STONE. The stone from these quarries is known as the "Wooden Beds," and is of a very crystalline nature, and undoubtedly one of the most durable stones in England.

THE BRAMBLEDITCH STONE. Is of the same crystalline nature as the Chelynch Stone, but finer in texture, and more suitable for fine moulded work.

Prices, and every information given, on application to CHARLES TRASK & SONS, Doulting, Shepton Mallet.

London Agent—Mr. E. A. WILLIAMS, 16, Craven-street, Strand, W.C. [ADVT.

**HAM HILL STONE.**

The attention of Architects is specially invited to the durability and beautiful COLOUR of this material. Quarries well opened. Quick despatch guaranteed. Stonework delivered and fixed complete. Samples and estimates free. Address, The Ham Hill Stone Co., Norton, Stoke-under-Ham, Somerset. London Agent: Mr. E. A. Williams, 16, Craven-st., Strand, W.C. [ADVT.

**Asphalte.**—The Seyssel and Metallic Lave Asphalte Company (Mr. H. Glenn), Office, 42, Poultry, E.C.—The best and cheapest materials for damp courses, railway arches, warehouse floors, flat roofs, stables, cow-sheds, and milk-rooms, graneries, tun-rooms, and terraces. [ADVT.

**DRY MAHOGANY,**

WAINSCOT, WALNUT, TEAK,

&c.

EXTENSIVE AND VARIED STOCK.

**WILLIAM BLOORE,**

80 to 90, BOND STREET, VAUXHALL, and 57 to 67, SOUTH LAMBETH ROAD, S.W.

**MICHELMORE & REAP,**

Manufacturers of

CHARLES COLLINGE'S PATENT

COLLINGE'S PATENT HINGES,
LEVER, SCREW, & BARREL BOLTS,
Self-Acting "FALL DOWN" GATE STOPS, and IMPROVED GATE FITTINGS of every Description.

36A, BOROUGH ROAD, LONDON, S.E.

PRICES REDUCED. LIST SENT ON APPLICATION.

TWELVE GOLD AND SILVER MEDALS AWARDED.

**ZINC AND COPPER ROOFING.**

**F. BRABY & CO.**

LONDON. 352 to 362, Euston-road. ++ LIVERPOOL. 6 and 8, Hatton Garden. ++ GLASGOW. 47 and 49, St. Enoch-square.

**VIEILLE MONTAGNE SOLE MANUFACTURING AGENTS.**

**NO SOLDER. NO EXTERNAL FASTENINGS.**

*Particulars on Application. Chief Offices:—Fitzroy Works, EUSTON ROAD, LONDON, N.W.*